THE DANUBE BASIN AS A PRODUCER AND EXPORTER OF WHEAT

INTRODUCTION

The important rôle of the Danube basin in the production and export of wheat in pre-war years is sufficient reason for attentive study of the region since the war. Post-war changes in the frontiers and the considerable social and economic changes connected with important agrarian reforms which occurred in this region afford still further reasons for special study.

Although in its entirety the Danube basin lies in several countries, the region may properly be treated as a unit. The water transportation facilities of the Danube River bind together all the countries situated along it. The Danube is the principal route for the exportation of the surplus agricultural products, especially of grain, in two directions — one through the lower Roumanian ports on the Danube and the Black Sea, and the other in the northwestern direction up the Danube, to Austria and southern Germany. Climatic conditions of the Danube basin have certain peculiarities which lead geographers to speak of a special Danubian climate. The typical agricultural character of the countries bordering the Danube, with the major part of their population occupied in agriculture, is also common to all Danube countries.

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However, there are good reasons for setting the limits of the Danube basin a little narrower than they are often defined. We understand as the Danube basin the territory now covered by four countries: Roumania, Hungary, Bulgaria, and Jugo-Slavia. Before the war the corresponding region was covered by Roumania, the Hungarian part of the old Austro-Hungarian monarchy, Bulgaria, and Serbia (with the inclusion of certain Austrian territories and Russian Bessarabia). Only one area, which logically may be included in the Danubian surplus wheat region, now remains outside of the territories of the four countries mentioned above. This is Slovakia, now a part of Czecho-Slovakia, but before the war a part of Hungary. It borders the Danube north of Hungary, and is a predominatingly agricultural country, with the majority of its population occupied in farming. It is a surplus wheat region, and climatically it continues the adjacent Hungarian region where the cultivation of corn (maize) is possible. However, Slovakia is now a part of Czecho-Slovakia, which in its entirety is an industrial country with a deficit of some agricultural products, especially of wheat. For this reason we leave Slovakia outside of our study and shall concern ourselves with it only in special cases.

Austria also does not belong to the Danubian surplus wheat region. Austria is a country with a deficit of agricultural products, especially of wheat. Its population is more industrial. Climatic conditions also are different. Here we do not find the corn cultivation so characteristic of the Danube basin.

Thus defined, the Danube basin includes the entire plain of the middle and lower Danube, beginning a little below Vienna. It includes, also, the plains and valleys of its principal tributaries: from the east and north side the Tisza, Olt, Seret, Prut, and many smaller rivers in the Danubian plain in Roumania; from the west and south side the Drava, Sava, Morava, and also many smaller rivers that cross the Danubian tableland of northern Bulgaria.

Besides the plains and lowlands, the Danube basin includes several mountain systems: the East Carpathian, and the Transylvanian Alps in Roumania; the Balkan ridge and Rhodope mountains in Bulgaria; and the complex mountain system of the Dinaric and Illyrian Alps in Jugo-Slavia following the Adriatic coast.

The southern part of the region (southern Bulgaria and Jugo-Slavia) is practically outside of the Danube basin. It includes the basins of smaller rivers flowing into the Mediterranean Sea, such as the Maritza and Struma in Bulgaria, and the Vardar in Jugo-Slavia. But only the basin of the Maritza in southern Bulgaria has some importance as a wheat-producing region. The valleys of other mentioned rivers, which do not belong to the Danubian system, have only slight significance as wheat-producing regions. We include them in the Danube basin because they lie within Bulgaria and Jugo-Slavia, and statistically are treated as parts of them. But, since their rôle is insignificant, we may still call our region the Danube basin, reminding the reader that it does not include the upper Danube beginning with the Austrian frontiers. The principal wheat-producing areas of the region follow the rivers of the Danube basin. The mountainous areas mentioned above are not important as wheat producers, and sometimes they are wheat deficiency areas.

The importance of the Danube region as defined may be seen from the fact that during ten years preceding the Great War the exports of wheat from that region, including transfer of wheat from Hungary to Austria within the border of the old Austro-Hungarian monarchy, was sometimes nearly equal to Russian wheat exports and sometimes larger than exports from the United States; and these two countries were the largest wheat exporters of the world. Hence the Danube basin ranked among the largest wheat exporters.

More than 100 million bushels of wheat (including wheat flour) were exported yearly on the average from the Danubian surplus area during the last ten years before the war. About a third of the total arable area of the Danube basin was sown to wheat, and a large percentage of the wheat produced was exported. The percentage of exports of wheat to home production in one of the Danube countries—Roumania—was as high as the percentage of wheat exports from such a young country as Argentina or Australia. The other Danube countries—Hungary, Bulgaria, and Serbia—also exported a large part of their wheat crops, about 25–30 per cent of their total wheat production.

Since the war the situation has changed. The Danube basin exports only a moderate quantity of wheat. The region was influenced by the war and the consequences of the war perhaps more than any other wheat-producing area. This change itself justifies close study of the post-war situation of wheat production in the region in comparison with its pre-war position.

I. LAND, CLIMATE, AND PEOPLE

The Danube basin, as defined above, is now divided among four countries: Roumania, Hungary, Jugo-Slavia, and Bulgaria. It extends from 40° 41′ north latitude in the south (on the southern border of Jugo-Slavia) to 49° 12′ north latitude on the north (to the northern border of Roumania). Its southern border passes along the 41st parallel. From west to east the Danubian region extends from 13° 40′ east longitude on the west (on the extreme northwestern border of Jugo-Slavia) to 30° 21′ east longitude (on the extreme eastern border of Roumania in Bessarabia). From south to north, the region extends for about 560 miles and from west to east for about 800 miles. The area is given as 285,495 square miles, divided among the different countries as follows:

Roumania	113,856
Jugo-Slavia	95,942
Bulgaria	39,827
Hungary	35,892
Total	285,517

The total territory of the Danube basin is thus larger than that of any of the great countries of Europe except Russia.

Orography

A general view of the orography of the Danube basin is given in the following map

(see p. 192). Hungary in her new frontiers is the most level country of the four Danube countries. The eastern part of Hungary is situated on the great Danubian plain, the so-called Alföld, a type of level prairie practically without any undulation, bordered only on the north by a hilly region, the larger part of which is now in the limits of Czecho-Slovakia. A second hilly region of Hungary is in the western (trans-Danubian) part of Hungary. Interior hills extend from the northern border of large Balaton Lake in the northeastern direction and across the Danube; from there they continue to follow the northern borders of Hungary.

The level character of Hungary may be seen from the fact that some 60 per cent of the total area is arable land. Forest and pasture in the mountainous regions now belong to Czecho-Slovakia in the north, and to Roumania in the east (Transylvania). Hungary, in the post-war frontiers, has a smaller percentage of forests and pasture than had pre-war Hungary.

Roumania is a far more mountainous country than Hungary. In the center of the country lie the Carpathian mountains which form, as it were, the spinal column of Roumania. The country stretches east, west, and south of the main chain of Carpathians. The central mountain system is known in the north and east as the eastern or Moldavian Carpathians, and in the south as the Transylvanian Alps. The Carpathians do not have the compact character of the Alps, and do not represent such an important barrier as the latter. The passes are numerous, especially in the eastern Carpathians, either following valleys or following the flow of rivers which cut right through the mountains.

On their outer curvature, to the south, the Carpathians are bordered by a hilly zone which forms a broad belt west of the Olt, a tributary of the Danube. The belt narrows gradually toward the east, retiring toward the mountains and gaining height. In the western part of Old Roumania (Oltenia), a hilly zone occupies about two-thirds of the total area. Plains border only the Danube. Farther east, in Muntenia, low plains occupy the larger part of all areas. The total area of the Danubian low plain in Roumania is about 11,500 square miles.

The territory east of the main chain of the Carpathians (Moldavia and farther in the east Bessarabia) presents a tableland about 200 meters in height. The northern part is fairly level; in the center it is a rather hilly region; in the south it descends and becomes a level prairie area, the so-called Buceag Steppe.

The inner bend of the Carpathians is occupied by Transylvania, in form a basin surrounded on all sides by mountains. On the north, east, and south the basin is bounded by the main Carpathian mountains. On the west it is bordered by the Bihar massif, which previously formed a part of the main Carpathian highland but later was separated by the depression of the great Transylvanian basin. Transylvania is drained on the west by the Maros and Körös rivers, tributaries of the Tisza; in the southwest by the Olt, tributary of the Danube, which cuts through the Carpathians. The Transylvanian basin is characteristically a rolling country, with the hills rounded at the tops, attaining an average height of something under 500 meters. Here and there they are divided by large valleys. The basin offers a rather favorable field for agricultural activities. It is similar to the hilly regions in southern Roumania, bordering the Carpathians from the south.

That Roumania is less level in character than Hungary may be seen from the smaller percentage of arable land to the total area of the country. Arable land constitutes only 42 per cent of the total area of Roumania. Only Bessarabia has about the same percentage of arable land as Hungary, a little more than 60 per cent. Pre-war Roumania had less than half of its area in arable land, and Transylvania only a third.

Still more mountainous is Bulgaria. Genuine plains occupy a little less than a third of the area. The major part of the plain area lies in northern Bulgaria, the Danubian tableland; the smaller part consists of the Stara Zagora plain and the Maritza valley south of the Balkan ridge. The area which may be regarded as agricultural area (below 500 meters) occupies about two-thirds of the country. Arable land is only a third of the total area. The Balkan ridge stretches from east to west and divides Bulgaria into the northern and southern parts.

The Rhodope and Rila mountains cover the major part of southern and western Bulgaria.

The most mountainous of all the four Danube countries is Jugo-Slavia. Only the northeastern part of this country is level, consisting of the great Danubian plain, which continues the Hungarian plain. This part of Jugo-Slavia (Voivodina and the eastern part of Slavonia) was a part of pre-war Hungary. It now covers from a fifth to a fourth of the total area of Jugo-Slavia. The rest of the country is hilly or mountainous. The western part is occupied by the Alpine system. In the northwestern corner (Slovenia) are the Julian Alps, the Karavanian Alps, and the Steiner Alps. One low branch of the Alps continues eastward into Croatia and Slavonia and runs in the form of a narrow chain between the Sava and Drava valleys. A more important Al-

MAP 1

pine system—the Velebit mountains and the Dinaric Alps—continues in a southeasterly direction closely paralleling the coast of the Adriatic Sea. East of this range are several minor parallel ranges running from the northwest to the southeast and gradually decreasing in elevation with the distance from the coast. Slowly they descend toward the Danubian plain. On the eastern

frontier of Jugo-Slavia east of the Morava River, the country is covered by different mountain systems crossing the border from Roumania and Bulgaria. The Carpathians (Transylvanian Alps) cross the Danube and follow a southern direction. The Balkan range crosses the frontier from Bulgaria and follows the northwestern direction. The southern part east of the Morava River is covered by an irregular and disconnected series of mountains of the Rhodope system, which continues the Bulgarian Rhodope.

Because of the mountainous character of Jugo-Slavia, only a fourth of the total area consists of arable land, and this arable land is very unequally distributed. The least favorable region for agricultural activity lies in southwestern Jugo-Slavia, the so-called "Karstland," covering about a fourth of the country. Here in many regions arable land is less than 10 per cent of the total area and never more than 20 per cent. The Karstland is a barren, stony limestone district, devoid of surface water and with little or no surface soil. Valleys constitute the only comparatively fertile areas in the Karst region. This region covers practically all of Dalmatia and Herzegovina and much of the western portions of Bosnia, Montenegro, and Croatia, and is of little interest for further study, being deficient in agricultural products. On the other hand, the northern and eastern regions of Jugo-Slavia (Voivodina) have about 70 per cent of their area in arable land.

The total territory of the Danube region may be divided between the plain lowland of the Danube and its tributaries, and the mountainous and hilly area. The greatest part of post-war Hungary consists of lowland. In the northwestern corner it includes the southern part of the so-called small Danubian plain, the northern part of which now belongs to Czecho-Slovakia. All the central and eastern area of Hungary consists of the great Danubian plain (Alföld), limited on the north by the Carpathian system of mountains, and on the east by the Bihar massif in Transylvania and by the Transylvanian Alps. To the south the great Danubian plain continues farther within the borders of Jugo-Slavia and is limited on the south by the course of the Sava. The great plain does not extend west of the Danube; the west shore of the river on the boundary of Hungary has not the character of a steppe. Western Hungary, the so-called trans-Danubian region, is a rolling, sometimes hilly, country, which nevertheless presents a very favorable field for agricultural activities. In the east the great plain extends many miles farther beyond the Hungarian border, and belongs now to Roumania. The southern part of the great plain extends far into Jugo-Slavian territory and includes the richest agricultural region of Jugo-Slavia, formerly called Banat and Backa (or Bashka). The great Danubian plain covering the greatest part of Hungary and the northeastern part of Jugo-Slavia, also a border area of western Roumania, is perhaps the richest wheat area of the Danube basin. There the prairie plain (steppe) extends the farthest to the west from eastern Europe. The total area of the great Danubian plain is about 42,000 square miles, about as large as the state of Tennessee.

Farther to the southeast the Danubian plain becomes narrower and narrower. The Transylvanian Alps of the Carpathian chain turn south and cross the Danube from Roumanian territory into Jugo-Slavian. The Danube crosses this mountainous region; its course becomes narrower, sometimes as narrow as 150 meters; the current becomes more and more rapid. This is the most picturesque region along the course of the Danube, and at the same time the most barren. For about 80 miles the Danube flows through the mountains.

After passing the Iron Gate (near which stood the Bridge of Trajan), the valley of the Danube again becomes wider; here begins the plain of the lower Danube, the Roumanian plain. Farther toward the east the plain becomes larger and larger and it covers all the southern area of Roumania. On the north the plain is shut in by a hilly region south of the Transylvanian Alps, but the farther we follow the course of the Danube, the more the hilly country recedes on the north and the plain widens. The total Roumanian plain covers about 11,500 square miles. The southern Bulgarian shore of the Danube is not as low as the northern Roumanian shore. However, the Bulgarian shore of the Danube is also rather level—a slightly rolling tableland. This tableland is

bordered on the south by the Balkan mountain chain. It is the best agricultural region of Bulgaria, as the Danubian plain north of the Danube is the best agricultural region of Roumania.

In the east the Roumanian plain is bounded by the tableland of Dobrogea, continuing the plateau land of north Bulgaria. The Danube turns north until its course meets the plain of southern Moldavia and Bessarabia, where the Danube turns once more in the eastern direction. Through the steppe-plain of southern Bessarabia (Buceag Steppe) the Roumanian plain joins the vast steppe of Ukrainia.

Climate

The location of the Danubian region in the southern part of central Europe, and in some measure its orography, determine the climatic characteristics of the region. The climate of the Danube basin may be defined as central European climate, though the central European climate itself is not uniform, but varies from the strictly continental climate of eastern Europe to a sea climate (Atlantic) in western Europe. The southern location of the Danube basin near to the Mediterranean Sea makes its climate also transitional to the Mediterranean climate. Thus three factors influence climatic conditions in the Danube basin—the strictly continental climate of the steppes of eastern Europe; the moderate sea climate (Atlantic) of western Europe; and the specific climate of the Mediterranean borders of southern Europe. However, these three factors do not have equal influence. It may be said that the eastern continental climate has preponderance in determining the climate of the Danubian country, especially the climate of its plains. The lower Danubian plain—the Roumanian plain and the Danubian tableland of northern Bulgaria and Dobrogea—is a direct extension of the southern Ukrainian steppe. This plain is completely open to the climatic influences from the east. Furthermore, from the south and the west this plain is in a certain measure isolated from Mediterranean influences by the Balkan and the Carpathian mountains. For this reason it is quite natural that the continental components of the steppe climate are the most pronounced here. However, the great plain (Pannonian Plain) of the middle Danube, including the Hungarian plain and the northeastern part of Jugo-Slavia, is also strongly under the influence of the eastern continental climate. The Carpathians are not high enough to be more than a partial barrier to the influence of the east. The Balkan mountains stretch from east to west and hence are no barrier to eastern influence. But on the west, the Alpine mountain system is a more important barrier against the Atlantic influences of western Europe. The line of the wind divide passes north of the Alps through northern Switzerland. In Germany western winds are dominant; but in the Danube basin, in addition to southwestern winds, there are northern and northeastern winds, dry and cold in winter as on the steppe of Ukrainia and Russia.

Hence the Danube basin has colder winters and hotter summers than western European countries. The difference between the average temperatures of the hottest month (July) and of the coldest month (January) is for all the Danube basin some 22°C. to 25°C. (over 40°F.), which is characteristic of the continental climate. The differences between the extreme fluctuations of temperature are very large. In the summer the temperature is higher than 30°C. (86°F.), sometimes as high as 40°C. (104°F.); and in the winter it sometimes falls below −20°C. (−4°F.). The January isotherm 0°C. (32°F.) always passes south of the Danubian plains through southern Bulgaria and Jugo-Slavia. Only in the western part of Hungary and Jugo-Slavia does the 0°C. January isotherm move northward into the plain. On the other hand, the July isotherm 20°C. (68°F.) always passes north of the Danube basin. Furthermore, the Danubian plain is always south of the July isotherm 22°C. (71.6°F.). This isotherm extends into the Danube countries only in the Carpathians, passing through their southern slope. All of the Roumanian plain is therefore south of the 22°C. July isotherm. The July isotherm 24°C. (75.2°F.) may be regarded as the southern limit of the Danubian region. This isotherm passes south of Bulgaria and crosses southern Jugo-Slavia. The Danubian plain is roughly between the 22°C. and 23°C. (71.6°F. and 73.4°F.) July isotherm. The yearly mean tempera-

ture in the Danube basin is, in the major part of the basin, from 10°C. to 12°C. (50°F. to 53.6°F.); only Moldavia and Bessarabia are north of the yearly isotherm 10°C. (50°F.). These last regions have cold winters and the yearly mean temperature in the northern parts of them is as low as 7°C. (44.6°F.). But all the Danubian plain in Roumania and in Hungary is south of the average yearly isotherm 10°C. (50°F.). On the other hand, the yearly average isotherm 12°C. (53.6°F.) always passes south of the Danube basin. It crosses Bulgaria in the region of the Balkan mountains and crosses Jugo-Slavia north of Sarajevo.

The above characteristics of the climate of the Danube basin concerning temperature show that the climatic conditions of the Danube basin have many similarities to the climate of certain regions of the American corn and hard winter-wheat belt. However, the climate of the American hard winter-wheat region is still more continental. The winters in the American hard winter-wheat region have about the same temperature (in northern Nebraska a little colder), but the summers are considerably hotter.

Climatic conditions from the point of view of temperature are very uniform throughout all the Danube basin, especially throughout the Danubian plain. The average temperature for a year through all the plain changes, according to regional averages, only from 10°C. to 12°C. (50°F. to 53.6°F.); the July average temperature from 22°C. (71.6°F.) to 24°C. (75.2°F.), and the January average temperature from 0°C. (32°F.) to −3°C. (26.6°F.). Perhaps the most important difference throughout the region is that climate becomes more and more continental from west to east. On the extreme western border of Jugo-Slavia, on the Adriatic shore, the difference between the average July temperature and the average January temperature is only 16°C.–17°C. (28.8°F.–30.6°F.); that is, climate is moderately maritime. On the east side of the Alpine ridge, however, this difference is about 22°C. (39.6°F.), the same as prevails in the extreme western part of Hungary. On the eastern border of Hungary (Debrecen), this difference increases to 24°C. (43.2°F.), and on the extreme eastern border of Jugo-Slavia (on the Danube), the difference between average July and January temperature becomes as great as 25°C. (45°F.). In the eastern region of Roumania this difference becomes still larger. For Jassy it is 25.4°C. (45.7°F.), and the eastern part of the Danubian plain in Roumania more than 26°C. (46.8°F.).

Rainfall

The precipitations are moderate in the Danube basin. Aside from the mountainous regions and the extreme western borders of Jugo-Slavia, other regions of the Danube basin, especially of interest from the point of view of agricultural production, obtain a yearly average precipitation of from 20 to 30 inches. Certain regions in the extreme eastern frontier—southern Bessarabia, Dobrogea—have less rainfall, as low as 15 to 20 inches. The most common precipitations in the Danubian plain are from 22 to 28 inches; such they are in Hungary on the Danubian plain, in Jugo-Slavia, in Bulgaria, and in the Danubian plain of Roumania. The general tendency is an increase in the precipitation from east to west. Eastern Hungary is dryer than western; Jugo-Slavia has considerably less precipitation in the east than in the west. The driest region of all the Danube basin is in eastern Roumania, Dobrogea, and southern Bessarabia. Another factor which influences the distribution of the rainfall is the altitude of the locality. Hilly and mountainous regions obtain considerably more precipitation than low plains or tablelands of a moderate height. In the Carpathian mountains 35 inches of rain fall every year, in some years as much as 47–48 inches. However, the inner plateau, Transylvania, has an average of 27–28 inches, while in the center of the Transylvanian basin it falls to less than 24 inches. The Balkan ridge receives a little less precipitation than the Carpathians, but more than the surrounding plain. The heaviest precipitation falls upon the western mountainous regions of Jugo-Slavia nearest to the Adriatic sea. Generally these mountains get more than 60 inches. Some of the localities there get considerably more and are the most rainy localities of Europe. But this involves only a very limited region on the extreme west of Jugo-Slavia. Other localities of the Danube basin receive only moderate rain-

fall, and have the character of a steppe or prairie region. Only hilly or mountainous regions are covered with forest. The plains through all the Danube basin resemble the steppe—flat and bare of trees.

The distribution of rainfall through the year exhibits also the continental features of the Danubian climate. Major precipitations fall late in the spring or in summer. The most rainy months are May, June, and July. In the southern regions the maximum rainfall is in June, but farther to the north and in the west, the maximum arrives during July. August and September are rather dry. The influence of the Mediterranean climate manifests itself in the existence in certain regions of a second smaller peak of rainfall during the fall, in October. This is typical for Hungary and Jugo-Slavia, but less so for Bulgaria and eastern Roumania, where October is also dry. Such a distribution of precipitation through the year is favorable for the agriculture of the region. The crops receive the rain just during the vegetation period in hot months. The second peak of rainfall in October is favorable for sowing winter wheat. Dry weather in August and September is favorable for the ripening of corn and for harvesting of the crops of small grain. Such a distribution of rain throughout the season makes the Danubian region favorable for agricultural activities, notwithstanding the moderate total of precipitation.

An unfavorable characteristic of climatic conditions in the Danube basin is the fluctuation of rainfall from year to year. The average quantity of rainfall is sufficient for the development of crops grown in the region, but not infrequently there are years with a considerably smaller amount of precipitation, and in such a year the crops suffer from drought. For wheat, deficiency of rainfall in May–June is especially harmful. Furthermore, precipitations on the plain fall in the form of a few heavy downpours. A single downpour forms a considerable percentage of the total precipitation. Then follows a long period with no rain at all. Dry periods during the summer often are too long, and this influences the crops unfavorably.

Thus, from the point of view of distribution of rainfall, the Danubian plain exhibits the typical characteristics of the eastern continental climate, with specific dryness, unevenness, and fluctuations. The mountain regions are more humid, and have a more even and moderate climate, similar to that of western Europe. The climate in the mountainous region on the extreme northwest, the Alpine region, most clearly resembles the western Atlantic climate. We meet a specific Mediterranean type of distribution of precipitation in the narrow border region following the Adriatic coast. Here a maximum of rainfall arrives in the fall and winter, also early in the spring. All the summer is dry. As a result this region, in spite of the large total quantity of precipitation, has the driest summer. This region belongs to the above-mentioned Karstland, and is of little interest from the point of view of agricultural activity. The Mediterranean climate is limited to a narrow region west of the Dinaric Alps, which stop further spreading of this type of climate to the east.

In conclusion it may be said that, of all land in the four Danube countries, the Danubian plain and the regions adjacent to this plain are climatically best adapted to agricultural production. They have climatic conditions comparable to the prairie regions of America or of eastern Europe, though the Danubian climate is less continental, and is a little moderated by the influence of the climate of western Europe. This last influence becomes more and more pronounced when we move through the Danube basin from the east to the west, or when we rise from low plains to the hilly and mountainous regions.

Soil

Climate is probably the most important factor determining the nature of the soil. For this reason the above description of the climatic conditions of the Danube basin and the definition of certain climatic regions there afford the basis for description of the soil qualities and soil regions of the Danube countries. Here it is possible to give only a general picture of the distribution of soils without details, because in this field there are too many local diversities which cannot be considered in the present study.

From the point of view of climatic conditions, we contrasted the plain with the hilly

and mountainous regions. The same contrast may be made from the point of view of soil properties. The soil of the Danubian plain and of the neighboring level tableland (Moldavia, North Bulgaria, Dobrogea) has the specific qualities of prairie soil, formed under the influence of comparative dryness and of high temperature. When we ascend to the hilly regions and then to the mountains, the soil loses more and more the qualities of prairie soil and acquires the properties of a forest or sylvan soil. In the plain we meet black or dark brown (chestnut or chocolate colored) prairie soil; on the hills it becomes brown sylvan soil and further in the mountains it becomes pale gray sylvan soil. In the plain it is rich in humus and nutritive elements. On the hills it becomes poorer and poorer in humus and nutritive elements; the more humid climate and greater rainfall wash away the soluble components of the soil.

Hungary, the country with the predominance of level land, has a larger percentage of prairie soil than any other Danubian country. All areas of Hungary east of the Danube, with the exception of the northern mountainous borders, have the dark brown prairie land (tchernozem), rich in humus (5–6 per cent). This soil is mostly superimposed on loess, sometimes on marl. In the regions adjacent to the rivers it is heavy meadow clay land, black and very fertile. These last soils were formed on the former marshland, irrigated later and turned into arable land. It is typical of the Hungarian prairie region that, in poorly drained and completely level regions, there is alkaline soil, the so-called Szik or salted land. The worst of these lands are bare and sterile. On the better of such lands grain crops are possible, especially winter grain (wheat). These lands may be improved by admixture of gypsum or marl.

Two districts on the great plain of Hungary do not have the rich dark prairie soil. These are two regions of light sandy soil which is not good for wheat. One of these lies between the Tisza and Danube rivers, south of Budapest, and extends to the Jugo-Slavian frontier. The other is on the left bank of the Tisza in the northeastern corner of Hungary. Both of these localities are characterized by a low percentage of wheat acreage and high percentages of rye and potatoes. With the exception of these two sandy regions, all the Hungarian plain has a rich prairie soil, especially favorable for wheat.

The trans-Danubian region of Hungary, west of the Danube, has prairie soil only in a limited area on the bank of the river. Farther to the west the soil, under the influence of greater precipitation and higher elevation, becomes poorer in humus and in soluble nutritive components. It is dark, or brown, sylvan land. Since precipitation is not heavy, the process of disintegration of the soil is not much advanced. These soils remain rich in hydroxide of iron and contain still a notable percentage of humus (3–4, or sometimes 5 per cent). The presence of hydroxide of iron gives a reddish-brown color to the soil. The infertile pale gray sylvan soils are found only on the extreme western borders of Hungary.

The dark brown prairie soils of the great plain of the Danube extend farther south to the Danube and Sava rivers and cover the northeastern plain of Jugo-Slavia (Voivodina and eastern Slavonia). South of the Sava and the Danube, in the hilly region of Old Serbia, the soil becomes reddish-brown. In the valleys which cross Old Serbia the soil is darker, near to black, with more humus. On the hills it becomes a pale sylvan soil. Farther west (Croatia, Slovenia, Bosnia) the soils of Jugo-Slavia show more and more the properties of sylvan soils. Heavier rainfall washes away greater quantities of soluble components and the soils become a pale gray. On the western borders of Jugo-Slavia in the Karst region we meet barren limestone rock deprived of surface soil (on high lands), or soil typical of the Mediterranean region — red soil (laterite, terra rosa), poor in humus and in soluble elements.

In Roumania the distribution of the soils follows the same principles. The Danubian plain and the tableland of eastern regions of Roumania (Bessarabia and Moldavia, also Dobrogea) have the black or dark brown prairie soil (tchernozem). These prairie soils of Roumania are the extensions of the widespread black soils (tchernozem) of the steppes of Ukrainia and Russia. In the northern parts of Moldavia and Bessarabia the prairie soils are sometimes

richer in humus than is the Hungarian prairie soil, and contain sometimes from 7 to 8 per cent of humus. In other localities it is not so black and not so rich in humus. In southern Bessarabia and in the southeastern part of the plain of old Roumania we meet the nut-brown steppe soil typical of the southern dry steppe of Ukrainia, with about 4 per cent of humus. Here may be met, as in Hungary, alkali land in the less well-drained localities. Roumanian soils are rich in potash and nitrogen, but contain rather small quantities of phosphorus. The plains nearer the hilly regions and in the hilly regions have the reddish-brown sylvan soil with 3–5 per cent of humus. In Moldavia this type of soil forms only a narrow strip bordering the steppe. In Muntenia, on the contrary, reddish-brown soil covers a large area north of the black prairie soil of the Danube plain. Such a brown sylvan soil is typical also of Transylvania.

The regions of the higher mountains in Roumania and the tops of the hills have typical pale gray sylvan soil, poor in humus (about 1–2 per cent). The Moldavian Carpathians, Transylvanian Alps, and the Bihar massif have pale sylvan soils.

Dr. Al. Zaharia[1] estimates that the three principal types of soil (prairie, brown sylvan, and pale sylvan) are about equally represented in the territory of pre-war Roumania. However, if we take only arable land, the dark prairie soil covers about 50 per cent of it, because the pale sylvan soil is peculiar to the highlands, where the percentage of crop land is limited.

The soils of the northern Bulgarian tableland north of the Balkan ridge, as well as the soils of the plains of southern Bulgaria (the Basin of Maritza), may also be characterized as dark prairie soils.

As a general conclusion it may be said that the Danubian plain about everywhere is covered with a fertile dark prairie soil, rich in humus. The lower lands in the hilly regions have reddish-brown sylvan soil, which also is fertile. Pale gray sylvan soils, poor in humus, we meet only in the mountainous regions, which are not important from the point of view of agricultural production. Consequently, the soil properties of the Danube basin may be regarded as favorable for agriculture. The soil cannot be regarded as a limitation upon agricultural productivity. The most important limitation may be the dryness of climate in certain regions, the uncertainty of the distribution of rainfall, and considerable fluctuations in the rainfall from year to year.

[1] *Le blé roumain* (Bucharest, 1910).

Population

The population of the Danube basin is most various and heterogeneous. The history of the basin is complex. Many peoples have passed through and left a residue behind, and many peoples mingled. The modern nations of the Danube basin are the result of this mingling, as is true of practically all other modern nations. However, perhaps the mixture of different races in the Danube basin was even more extreme than in other European regions. From the point of view of climate the Danube basin is the region of transition between the east and west, with certain influences from the south. It is a region of transition also from the point of view of population.

Into the Danube basin the east European and Asiatic steppe runs the farthest to the west. For that reason, when Asiatic peoples invaded Europe during various transmigrations of population, the Danube basin received the largest number of the invaders, among them Huns, Avars, Bulgarians, and Hungarians. The Danube basin served also as a great highway for European nations moving eastward. Gepidae, Ostrogoths, Lombards, one after another took a long rest here. Germans were succeeded by Asiatic nations. The Hungarians entered the Danubian plain from the Urals at the end of the ninth century, passing down the lower Dnieper and the Don, and since that time they have remained in Hungary. Thus the Hungarians are one of the Asiatic nations which settled more than a thousand years ago on the Danubian plain.

The name of one other Danubian nation —Bulgaria—also is connected with the Asiatic peoples. The Bulgarians arrived from the Volga basin in the seventh century. They conquered the Slavic population on the lower Danube and organized them into a strong nation. However, it was rather the conquered Slavic people than the Asiatic conquerors that most influenced

the formation of the modern Bulgarian nation. The Bulgarian language is a pure Slav language, practically without any trace of Asiatic Bulgarian.

The Serbian population (Serb, Croat, Slovene) of Jugo-Slavia also descended from the Slavic peoples who settled long ago on the Balkan peninsula. Roumanians are regarded as descendants of romanized Dacians who have inhabited the region of present Roumania since the time of the Roman empire.

These are the four principal racial groups which actually inhabit the Danube basin. They constitute about 85 per cent of the total population. But other groups were important. After the fourteenth century the Balkan peninsula was conquered by the Turks, who later spread their power farther into the north. At the beginning of the sixteenth century they overpowered the Hungarians and took the major part of Hungary.

At the beginning of the eighteenth century the Turks withdrew from Hungarian territory. Serbia was liberated from Turkey in the beginning of the nineteenth century. Somewhat later the Roumanians were liberated, and thereafter the Bulgarians, in the 'seventies. Thus the Turks held power in some regions of the Danube basin for two centuries, in other sections as long as five centuries. Certainly the domination of the Turk exerted much influence over the development of the peoples in the Danube basin, especially in the southern part of it. In Bosnia, southern Serbia, and southern Bulgaria the consequences of this domination are still felt. As a remnant of the Turkish supremacy there yet remains some Turk population in the southern reaches of Jugo-Slavia and Bulgaria.

In its northern part, Hungary was influenced in recent generations by the German nation. At one time the Hungarians were ruled by the Austrians; later they formed a dual monarchy on equal rights. We find in the Danube basin in the region of former Hungary several German colonies. The major part of this German population has now been transferred to Roumania (in Transylvania and Banat) and to Jugo-Slavia (in Voivodina). The Germans have formed the centers of the most progressive agriculture in the Danube basin.

As Table 1 shows, the four countries of the Danube basin contained a population of over 40 million in 1920, and over 43 million in 1925. Roumania and Jugo-Slavia, the countries of largest area, are also those of largest population. The total population of the Danube basin of over 40 millions is equal to the population of a great European nation such as Great Britain or France, and more than Italy. However, the density of population in the Danube countries is considerably less. It was around 153 per square mile in 1925. The greatest density was in Hungary (230); in other countries it was considerably lower, between 135 and 150. Especially small was the density in the southern regions connected until recently with Turkey. In southern Bulgaria, southern Serbia, and Bosnia, the density of population in most places was below 100 per square mile, sometimes below 80. These regions are mountainous and infertile and have only a limited productive area.

TABLE 1.—POPULATION OF THE DANUBE BASIN AND DENSITY PER SQUARE MILE*

(Million persons; persons,

Country	1920	1925	Density 1925 per square mile
Roumania	16.0	17.2	151.3
Jugo-Slavia	12.0	12.7	133.9
Hungary	7.9	8.4	230.5
Bulgaria	4.8	5.4	134.9
Total	40.8	43.9	153.1

* For 1920, census data for Jugo-Slavia, Hungary, and Bulgaria. In Roumania there has been no census since the war. Data for Roumania are official estimates (*Annuaire Statistique de Roumanie* for 1926). The data for 1925 are official estimates for all countries.

The distribution of the Danubian population amongst different racial groups may only be guessed at because Roumania has had no census since the war. However, such an estimate may come close enough to the actual distribution because three countries had a census about 1920 and it was possible to estimate distribution of the Roumanian population by basing it on the pre-war statistics of the component parts of Roumania. The data as of about 1920 are shown in Table 2 (p. 200).

Nearly two-fifths of the Danubian population are Slavs. The Slav population of

the Danube basin consists of the Slav majorities of two Slav countries, Jugo-Slavia and Bulgaria, both of which have more than 80 per cent of Slav population. Bulgaria has 83.4 per cent, and Jugo-Slavia 82.9 per cent not counting other Slavs. Roumania also has about a million Slavs, concentrated in territory on the eastern border, in Bucovina and Bessarabia, where Ukrainians are numerous. Second in importance in the Danube basin is the Roumanian race. All except about 300,000 Roumanians are in the border of new Roumania. They make up 70 to 75 per cent of the total population of Roumania. The newly acquired Roumanian territory has a rather mixed population. Roumanian population is in the majority, but there is also a considerable minority of other racial groups in Transylvania (about 1,700,000 Hungarians according to Hungarian statistics, and about 500,000 to 600,000 Germans); in Bucovina and Bessarabia there are many Ukrainians; and in southern Dobrogea, many Bulgarians.

TABLE 2.—DISTRIBUTION OF POPULATION IN THE DANUBE BASIN BY RACES (ABOUT 1920)*

(Thousands; per cent)

Nationalities	Number (*thousands*)	Percentage
Roumanian	11,800	28.9
Serb, Croat, Slovene	10,100	24.8
Hungarian	8,800	21.6
Bulgarian	4,300	10.5
German	1,800	4.4
Other Slav	1,300	3.2
Turk, Albanian, and others	1,400	3.4
Jews	1,300	3.2
Total	40,800	100.0

* Based upon census data for all countries except Roumania.

The most homogeneous population in all the Danube countries is now Hungarian (in the new frontiers). The regions with non-Hungarian population were all cut off from Hungary. Nearly 90 per cent of the total population are Hungarians (89.6 per cent in 1920, including Jews); of other nationalities only Germans are numerous (6.9 per cent, mainly in the western or trans-Danubian part of Hungary) and Jews. The last are principally in Budapest.[1]

Roumania has also a numerous Jewish population, about 700,000. The Jews are very active in commerce. The grain trade in Roumania and to some extent in other Danube countries is largely in the hands of the Jewish population.

It may be said that the population of each Danube country, taken separately, is homogeneous enough, though much mixed in some localities. The region with the most mixed population is perhaps that of Banat and Backa in the southern part of the Hungarian plain, which belonged formerly to Hungary and is now subdivided between Jugo-Slavia and Roumania. This region was left quite deserted after the withdrawal of the Turks in the beginning of the eighteenth century, though it constituted the best agricultural land of the Danubian plain. The Austro-Hungarian government which possessed this region after its liberation from Turkey invited colonists to come from Germany (Swabians) and from Serbia. Later, Hungarians also poured in from the north and Roumanians from the east. A mixed population was formed, and no one racial group had the majority. However, the colonist came not for national purposes but to further his material well-being, and here a mixed population sufficiently supplied with good land created the best agricultural region of the Danubian plain. A large percentage of medium-sized farms, good management, and progressive methods of farming (especially on German farms) characterize this region of mixed population.

In Transylvania also the population is mixed, consisting chiefly of Roumanians, Hungarians, and Germans. Here also German farmers introduced progressive farming methods, such as dairying and swine breeding. Here, too, medium-sized farms are more common than in most other sections of the Danube basin.

The third region with a very mixed population comprises Dobrogea and southern Bessarabia, on the south side of the Danubian delta. Here the Roumanian and Bulgarian population is mixed with many Turks and Tartars. German colonists also were invited to settle here. Numerous

[1] In the official Hungarian statistics Jews are enumerated as Hungarians, but according to the religious statistics about 5.9 per cent of the Hungarian population are Israelites.

Ukrainian and partially Russian populations colonized the steppe of southern Bessarabia and some regions in Dobrogea. A comparatively sparse population, with medium-sized farms, is characteristic here. Agriculture is less progressive than in Banat and Backa; Turks and Tartars are especially conservative, as is shown by their primitive methods of farming. But German colonists, and to some extent others (the Bulgarians and Ukrainians) have established good farming. The new character of the region offers much opportunity for the future of these pioneer farmers. There are many possibilities because the region is not overcrowded with poor peasantry. But the rather dry climate limits considerably the progressive development of farming in this region.

Being so different in their racial origins and historical development, all elements of the Danubian population cannot be on the same level of cultural development. The southern population, until recently under Turkish yoke, is on the lowest level of cultural development. Here are found the largest percentage of illiteracy, and the most primitive methods of agriculture. The northwestern region, principally within the limits of the old Austro-Hungarian monarchy, is on a comparatively high level of development, Slavs and Magyars alike. Northwestern Jugo-Slavia and western Hungary have the most advanced population, with the lowest percentage of illiteracy. The Roumanian, Bulgarian, and Serbian populations are in a medium stage of development. They have made considerable progress since their liberation, but much remains to be done before they reach the level of western European nations.

In spite of all these differences among the Danubian nations, one characteristic is common to them all. All are much inclined to agricultural activity. In no one part of middle and western Europe is so high a percentage of the population occupied in agriculture as in the Danube basin. This may be regarded as an index of low economic development. Except in Hungary, where the presence of such a large city as Budapest reduces the percentage of the agricultural population to 55.8 per cent, in all other regions of the Danube basin the percentage (active and dependent populations together) of the agricultural populations to the total is not lower than 70 per cent. This is shown in Table 3.

In some regions, for instance in Bosnia and Montenegro, the population engaged in agriculture is more than 80 per cent of the total. In the Transylvanian territory of Roumania it was 70.4 per cent;[1] and in northern Jugo-Slavia it was from 63.2 per cent in Slovenia to 76.5 per cent in Croatia.

TABLE 3.—PERCENTAGE OF THE TOTAL POPULATION ENGAGED IN AGRICULTURE IN THE DANUBE COUNTRIES*

Countries	Percentage
Hungary (1920)	55.8
Bulgaria (1920)	75.4
Jugo-Slavia[a] (1921)	73.8
Old Roumania (1913)	75.6

* Based upon census data.

[a] For Jugo-Slavia the statistics of occupations have not been published. The *Belgrade Economic Review* published the preliminary results, giving the occupations of the heads of households. Agriculture and mining together make 75.9 per cent; mining makes about 2.1 per cent.

With so large a percentage of the population engaged in agriculture, it seems clear that the agricultural population in the Danube basin is dense in spite of the comparatively moderate density of the total population, the more so if we take into consideration the fact that in certain mountainous regions there is a large proportion of unproductive land.

All of the agricultural area in the Danube basin may be estimated at about 98 million acres (plow land, pasture, meadow). The agricultural population in 1925 (70–75 per cent of the total) is about 31 or 32 million. Accordingly there are about 3 acres for each person engaged in agriculture, or from 12 to 15 acres per family engaged in agriculture. Of plow land there is about 2¼ acres per person, or from 9 to 11 acres per family of the agricultural population.

Such a quantity of agricultural land per family is not high for Europe. It is lower than in many countries of western Europe. This explains the aspiration of the agricultural population in the Danube basin for land reform to bring about more equal sub-

[1] L. Buday, *Dismembered Hungary* (Budapest, 1922).

division of land in the countries where large estates existed side by side with very small peasant holdings.

The increase of the population since the war in the Danube countries, with restricted emigration overseas, makes the problem still more difficult. The parceling of farms to smaller and smaller size becomes more and more necessary if the population will not or cannot turn from agricultural to industrial activity, especially when, as in the Danube countries, farms are subdivided in equal parts among the heirs.

One other unfavorable characteristic peculiar to the agricultural population in the Danube basin is its inclination to settle in large villages. This is a characteristic common to all steppe regions of the Danube basin. Only in the mountainous portions do farmers dwell in small villages, sometimes even on isolated farms. The historical development, involving a struggle with nomadic invaders, and climatic conditions, characterized by the absence of plentiful water sources, are responsible for this type of settlement.

An extreme example of this type of settlement is met on the Hungarian plain in the basin of the Tisza. This is a region of so-called "village-cities" with an agricultural population of several thousand in each. Farm people settled in such village-cities are so far from their lands that they are obliged to build houses and other buildings (called "tanya") outside the villages on their land for summer sojourn during the season of field work. Their main home remains in the village. Recently some have changed the custom and now begin to live more in their farm houses and return to the village only for short stays or for market time. On the Danubian plain in Roumania large villages (called "sat") centered around a deep well are common. The fact that these villages are few and far between adds to the mournful character of the steppe. Here also the people are far from the land which they work. Large villages are typical also of Dobrogea. The Roumanian population in hilly regions and in Moldavia dwells in rather small villages (called "cătuni"). Isolated houses are very rare.

In Bulgaria large villages predominate. About half of the population is in villages of from 500 to 1,500 inhabitants, with 100 to 300 houses. But from 25 to 30 per cent of the population is in still larger villages of 1,500–5,000 inhabitants each. Small villages are common only in the mountainous Bulgarian regions. Only about 3–5 per cent of the population of Bulgaria is in such small villages.

In the level area of northern Jugo-Slavia the large village is typical also. In Banat and Backa, comparatively recently colonized, the large colonization village of rectangular form built by colonists in the eighteenth century is typical. In the southern mountainous region in Bosnia the villages are smaller, the same as in mountainous Slovenia.

II. DISTRIBUTION OF LANDED PROPERTY

Though the Danube basin is homogeneous to a considerable extent from the point of view of natural conditions for agriculture, it offers very many and very strong differences in social conditions for agriculture. This is especially true of the distribution of landed property and of the systems of agricultural holdings.

The distribution of landed property in certain countries (Roumania, Hungary, and certain regions of Jugo-Slavia) was extremely unequal before the war and before the recent agrarian reforms. A great part of the agricultural lands was concentrated in the hands of few landowners. Estates of 5,000 to 10,000 acres were very common, and often they were larger. Certain owners worked their estates with hired laborers, as was true of a majority of the estates in Hungary. Some rented them in small lots to peasants, as was usual in Roumania. Side by side with these large *latifundia* many thousands of peasants had only small holdings of a few acres, which were too small to give work for the members of their families.

Between these two extreme groups, at least in certain regions, the middle-sized landholders did not exist. For instance, practically in all of pre-war Roumania, with few exceptions (Dobrogea), holdings of medium size were absent. It was the

same on the Danubian plain in Hungary. In other regions the group of medium-sized landholders was larger, as in the trans-Danubian region of Hungary, in Transylvania, and in Banat and Backa.

On the other hand, certain regions, as all Bulgaria and the area of old Serbia in Jugo-Slavia, may be cited as typical peasant countries, where large estates were completely unknown, and where a landowner worked his holding with his family and sometimes with one or two laborers.

It is quite natural that countries with such differences in their property distribution showed different evolution, when the era of land reforms began after the war. One of them, Roumania, changed the system of distribution of landed property quite radically. Large estates were in a great measure expropriated and divided among the peasants. Other countries tried to maintain large estates; thus even now there is an extremely unequal land distribution in Hungary. Finally, the countries where landed property was in the hands of small and medium peasantry, as in Bulgaria or Serbia, could change their land-holding system only a little.

Since the distribution of landed property and the system of land-holding greatly influence agricultural activity and more or less radical land reforms affect the agriculture at least for a short period, it seems desirable to discuss in considerable detail the land-holding conditions in the Danube countries and the changes introduced by the land reforms.

ROUMANIA

In Roumania there were sharp contrasts in the distribution of landed property. Most Roumanian peasants are descendants of former serfs. At the time of the abolition of serfdom in 1864 the peasantry received only small allotments of land. Sometimes they did not receive the total area which they worked as serfs. The landlords had the right to retain at least a third of their total land. In practice they retained more, and the peasants obtained only small lots for each family. About half a million peasant families (467,840) obtained only 4,364,477 acres of land. Each family on the average obtained less than 10 acres. The peasants in the western districts of Roumania, notably in Wallachia, received especially small lots.

At the time of the emancipation in 1864, the number of free peasants in Roumania was only a little larger than a fifth of the number of serfs. They kept more land than the former serfs were allotted; but, on account of the great numbers of serfs, even at the time of the abolition of serfdom the Roumanian peasantry in general was insufficiently supplied with land. Since that time the number of peasants has increased considerably. There was no opportunity for the agriculturalists to enter other occupations because the development of industry in Roumania has been very slow. The small lots of land were subdivided several times and became smaller and smaller. The sale of crown lands to peasants, initiated by the parliament thrice during the fifty years since emancipation (1881, 1889, 1907), did not change the situation substantially.

Before the war agricultural land in Roumania was divided about equally between two extreme groups. About one half, divided into small lots, belonged to the peasants. The other half was in the hands of a small number of landlords, and was concentrated in large *latifundia*. Table 4 gives a picture of the inequality in the distribution of land in pre-war Roumania.

TABLE 4.—DISTRIBUTION OF LANDED PROPERTIES IN ROUMANIA, 1905*

Size of estates	Number of estates	Percentage of total	Area in acres	Percentage of total
Up to 25 acres....	920,939	95.4	7,792,751	40.3
25–125 acres	36,318	3.7	1,719,721	8.9
125–250 acres	2,405	0.3	412,284	2.1
250–1,250 acres ...	3,314	0.4	2,017,312	10.4
Over 1,250 acres ..	2,061	0.2	7,398,180	38.3
Total	965,037	100.0	19,340,248	100.0

* Data from Creanga, "Grundbesitzvertheilung und Bauernfrage in Rumänien," *Schmollers Forschungen* (Berlin, 1908).

About a million peasant families possessed about 40 per cent of the land, while two thousand landlords possessed nearly the same. The average land property of the peasant family was about 9 acres, and the average estate of the landlord was about 3,500 acres. The group of middle

proprietors holding from 125 to 250 acres, typical of new agricultural countries, was practically absent in Roumania. Only in Dobrogea, the least populated and most newly colonized region of Roumania, was the group of wealthier peasants important and the larger estates not so numerous. To a certain extent medium holdings existed also in the hilly regions of Oltenia; the owners were the descendants of the former freeholders.

The land distribution in pre-war Roumania was similar to that typical of eastern Europe. Land was divided between two extreme groups. The middle-sized holdings with their efficient farmers were absent. Such a distribution of properties prevailed before the revolution in Poland, Ukrainia, and central agricultural Russia.

The distribution of landed properties in Roumania does not characterize exactly the distribution of agricultural holdings. Many of the landlords in Roumania did not organize agricultural production on all of their landed property. The majority of them rented their land to small croppers. Official Roumanian statistics show that in 1913 about 40 per cent of the agricultural area was rented, and that more than 50 per cent of the area in large estates was rented.[1] The distribution of land among agricultural enterprises in 1913 is shown in Table 5.

TABLE 5.—DISTRIBUTION OF AGRICULTURAL ENTERPRISES IN ROUMANIA ACCORDING TO AREA, 1913*

(Acres and per cent)

Enterprises by size	Area (*acres*)	Percentage
Up to 25 acres	7,998,450	55.4
25–125 acres	2,014,636	14.0
125–250 acres	264,850	1.8
250–1,250 acres	1,451,851	10.1
Over 1,250 acres	2,702,563	18.7
Total	14,432,350	100.0

* Data from *Annuaire statistique de la Roumanie*, 1915–16, pp. 50–51.

The percentage of the lands managed directly by the large enterprises was only 18.7 per cent, in comparison with 38.2 per cent as their part in the land properties. (See Table 4, above.) Thus the large estates were more than half rented. On the other hand, the smallest enterprises covered as much as 55.4 per cent of the area, against 40 per cent as their part in land property. We shall see later that even the land managed directly by landlords was mostly worked by peasants with their livestock and their implements.

An especially large percentage of the big estates, sometimes as much as 50 or 60 per cent, was rented to small croppers on the Danubian plain and in northern Moldavia. In the hilly and mountainous regions where large estates were less common, the percentage of rented land was considerably lower, only 10 to 25 per cent.

The inequality of land distribution in the other parts of the new Roumania, acquired since the war, was less pronounced, though still great enough. In Bessarabia, peasant property comprised before the land reform about 60 per cent of the total, and the private large estates (exceeding 270 acres or 100 dessiatines) were about one-third of the total area. The rest of the land belonged to the state, the crown, and the churches. Peasant holdings in Bessarabia were somewhat larger than in Old Roumania. In the northern part of Bessarabia, it is true, the inequality of the land property distribution was about the same as in Moldavia; landlords possessed more than half of the total area, and the peasant holdings were rather small. In southern Bessarabia, colonized later partially by foreign colonists such as Germans brought there by the Russian government, and also by the Ukrainian peasantry, the middle land property was represented more extensively. There was a considerable group of farmers with 25 to 125 acres of land. Generally speaking, the proportion of peasant property in southern Bessarabia was larger and, on the other hand, the proportion of the land belonging to large estates was smaller, than in Old Roumania. The distribution of land in southern Bessarabia was more similar to that in Dobrogea.

The importance of middle-sized peasant properties was greater in Transylvania. There, too, were German colonists who belonged to the middle group of landowners. The descendants of the Hungarian free-

[1] *Annuaire statistique de la Roumanie*, 1915–1916, p. 53.

holders — Szeklers — who were settled in the eastern districts of Transylvania, also belonged to the middle group. But the Roumanian peasantry in Transylvania was rather poor in land.

In the border zone of Roumania on the former Hungarian plain, west and northwest of Transylvania, the distribution of land was similar to that in the other districts of the Hungarian plain. The percentage of large estates was higher than in Transylvania, and practically the same as in Old Roumania; however, the peasantry there held larger farms than in Old Roumania.

Such was the distribution of landed property and agricultural holdings in new Roumania before the radical land reform occurred after the war. In practically all regions composing the new Roumania there were several hundred thousand peasants who possessed only small lots of land, not large enough to give sufficient work for their families. The peasants were anxious to get more land; their land-hunger was very strong, and several times before the war Roumanian peasants were near to revolt. In 1907 there were serious peasant risings in Roumania following agrarian risings of the peasantry in Russia in 1905 and 1906.

After the Russian revolution in 1917, the Roumanian government felt compelled to promise a radical agrarian reform to the people in order to prevent revolution in Roumania. The Roumanian constitution was altered in 1917 in order to permit the expropriation of large landed properties. Later, at the end of 1918, a decree was promulgated setting forth the principles of agrarian reform in old Roumania. In Bessarabia radical agrarian reform was proclaimed still earlier, before this region was united with Roumania. In 1920–21 several laws were promulgated fixing definitively the land reform in Old Roumania and in all new territories acquired by Roumania. Roumanian agrarian reform was perhaps the most radical of all reforms following the war. From a country of large landed property, Roumania became a country of small landed property with only a moderate percentage even of middle-sized estates.

At the end of 1927, the results of agrarian reform in Roumania were about as follows. About 15 million acres of land in Roumania had been expropriated. By different regions, the expropriations[1] were as follows:

	Acres
Old Roumania	6,860,570
Transylvania	4,111,322
Bessarabia	3,686,579
Bucovina	187,717
Total	14,846,188

In order to understand the importance of this expropriation it is necessary to recall that the total agricultural area in new Roumania is about 42 million acres; consequently 35 per cent of the total agricultural area[2] was expropriated to be divided among the peasants. The percentage of expropriated land was especially high in Bessarabia (about 40 per cent) and in Old Roumania, where the large estates were the most numerous.

All cultivable lands belonging to the crown and to all public bodies and legal persons, and all landed properties belonging to the subjects of foreign states and to absentee landlords, were expropriated in their entirety. Other land was to be expropriated if it was held in estates exceeding a certain size. The area which might be kept by proprietors in different regions was established by law. A distinction was made between owners who leased their land, owners who cultivated their own estates, and those who not only cultivated, but had also made certain improvements and constructed buildings. The quotas assigned to these different categories varied according to the district in which the properties were situated. In Old Roumania and Transylvania they were lowest for the mountainous and hilly regions; somewhat greater in those districts of the plain where there was a large demand for land; still greater where the needs were better satisfied; and greatest of all in those districts of the plain where there was sufficient land to satisfy all groups of peasants

[1] Data supplied by Professor A. Nasta, Director General of the Central Board for Land Reform (Casa Centrala a Cooperatie si Impropretarirei Satenilor).

[2] The 15 million acres of expropriated land included certain areas of forest land. If the forest land is subtracted, the expropriated area of agricultural land would be 12.6 million acres, that is, 30 per cent of the total area of agricultural land.

who might apply for land. Thus in Old Roumania in the hilly districts the area which might be kept by an owner was fixed at 250 acres; on the plain the greatest quota for an owner-cultivator was established at 625 acres. For owners with improvements, the maximum area not liable to expropriation on the plain was fixed at 1,250 acres. This was the maximum size of estates in Roumania after the agrarian reform.

The areas which could be retained by the proprietors in Transylvania were fixed considerably lower. Owners leasing their land could keep in mountainous and hilly regions only 70 acres and on the plains 140 acres; owner-cultivators retained 70 acres in mountainous regions, 140 acres in hilly regions, and a maximum of from 280 to 700 acres on the plains; the last large quota was for the regions where demand for land was already satisfied. Thus the largest estates in Transylvania after the land reform cannot exceed 700 acres.

The most radical reform from this point of view was in Bessarabia, where the quota of land which could be retained by a proprietor-cultivator was fixed for all regions at only 250 acres, and for owners leasing their land only at 62.5 acres, in spite of the fact that the peasantry in Bessarabia was better supplied with land before the reform than in Old Roumania. Thus all *latifundia* in the total area of Roumania disappeared. The largest estates now cannot exceed 1,250 acres, and this only in certain regions of Old Roumania. In other regions the estates are still smaller.

In spite of such extensive expropriation of lands from landlords, the Roumanian reform did not create middle-sized farms. The number of peasants without any land, or with only small lots of land, was so large that expropriated land was sufficient only to create small holdings or to increase a little the existing smallest holdings, which were below a certain size. For example, the standard plot of land to be granted to landless peasants in old Roumania was fixed at 12.5 acres, in Transylvania and Bucovina at 10 acres, and only in Bessarabia at from 15 to 20 acres. Peasants who held plots below these sizes obtained smaller grants, the size of which was equal to the difference between the typical grant to the landless and his actual holding. Hence on the average a peasant family in Roumania obtained from 6 to 7 acres.[1] Thus were large properties divided between the smallest landholders and agricultural workers. Their condition was improved in a certain measure, but land reform did not create new middle-sized farms. For the most part only the medium farms which existed before the reform, a majority of them in Transylvania, Dobrogea, and southern Bessarabia, continue to represent the medium size of landed property. But some formerly large estates passed into the category of middle-sized farms.

Official statistics[2] of the distribution of landed properties in Roumania after the reform suggest that now in Roumania a little more than 5 million acres fall within the estates exceeding 250 acres, that is, only 10.4 per cent of the total agricultural landed property. The largest percentage of agricultural land belonging to the estates exceeding 250 acres is in Transylvania, some 14.6 per cent. In other regions it is between 7 and 8 per cent.[3] Before the reform, as was mentioned above, this percentage for some regions was higher than 40 per cent.

We may conclude that Roumania by her agrarian reform became suddenly a country of small proprietorship in land, with only a moderate percentage of medium-

[1] By September 1, 1927, about 9 million acres of land had been divided among 1,368,978 families.

[2] Information supplied by the Central Office for Land Reform. This is only an approximate estimate because there has been no land property census in Roumania since the reform.

[3] There is a certain contradiction with the fact that, while in Transylvania before the war the percentage of large estates was smaller than in Old Roumania, the agrarian reform there was more radical. It seems that the statistics of landed property distribution compiled by the Central Office for Land Reform relating to Transylvania include not only agricultural land but also part of the forest land. If we take only agricultural land, it is possible that the percentage of the land belonging to the estates exceeding 250 acres is smaller than 14.5 per cent in Transylvania. The statistics of the distribution of arable land after the category of properties (large and small) given each year in the *Bulletin of Agricultural Statistics* by the Roumanian Ministry of Agriculture show that arable land in large estates in 1927 amounted to 1,504 thousand hectares, that is, 12.2 per cent of the total area of arable land in Roumania. In Old Roumania this percentage was 15.3 per cent; in Transylvania 8.8 per cent; and in Bessarabia 6.6 per cent. These figures agree better with the facts that the most radical agrarian reform was in Bessarabia, the less so in Transylvania, and the least in Old Roumania.

sized estates. Certainly such a radical change in the distribution of landed property ought to influence considerably the agricultural production of the country. Later we shall consider certain consequences of this agrarian reform. Here it is necessary, however, to recall that before the land reform in Old Roumania, about a half of the agricultural land of large estates was rented for a crop to peasants and the other half was worked in great part with peasant livestock and implements. Hence the land reform influenced the distribution of the landed property more than the land utilization or the organization of agricultural enterprises. As owners, peasants continued to work much the same land that they had worked previously as croppers. For this reason the radical land reform in Roumania had perhaps less influence on the agricultural production than it was reasonable to expect.

Hungary

The distribution of rural property in Hungary before the war was characterized above all by the preponderance of large estates. The large and middle-sized estates, exceeding 140 acres (100 arpents cadastral), in 1913 occupied 54.2 per cent of the total area of the country. And in that portion of Hungary lying within the post-war frontiers, the preponderance of rural property would be still greater because the mountainous and hilly regions of pre-war Hungary in the north and east, where small and middle-sized rural property owners were more numerous, were separated when the post-war boundaries were fixed. On the territory corresponding to the new frontiers of Hungary the estates exceeding 140 acres comprised 55.8 per cent of the total area in 1913. And that included the very large estates exceeding 1,400 acres which occupied the greater part of this area. According to the Hungarian statistics of agricultural holdings in 1895, such estates occupied about a third of the total area of the country.

Nevertheless, in Hungary a certain part of the peasantry was perhaps better supplied with land than the Roumanian peasantry. It is true that in the pre-war Hungary (Croatia excluded) about 1.3 millions of peasants were rural workers rather than farmers. They each had less than 7 acres of land, on the average from 2 to 3 acres. But there was a large group of peasants with land property above 7 acres and below 140 acres. These middle-sized peasant farms contained nearly half (46.4 per cent) of the total land area of pre-war Hungary. The average size of land property in this group was about 20 to 25 acres, somewhat larger than was the peasant property in Roumania. The group of peasants holding from 28 to 70 acres held 16.3 per cent of the total area.

The following figures show in greater detail the division of arable land in 1913 in Hungary within the pre-war boundaries and in the area corresponding to the post-war boundaries. Data are expressed as percentages of the total arable land.[1]

Size of property	Old boundaries	New boundaries
Up to 7 acres	13.6	9.0
7–14 acres	14.3	10.3
14–70 acres	34.6	32.3
70–140 acres	6.9	7.3
140–700 acres	12.5	14.0
700–1,400 acres	7.2	9.5
Above 1,400 acres	11.1	17.7

These figures emphasize the above-mentioned facts that in the portion of old Hungary now included within the new frontiers, large property is of more importance than in the total pre-war Hungary as a whole, and that there is an outstanding group of holdings of middle size, ranging from 14 to 70 acres. But the preponderance of large ownership was less striking with regard to arable land than to all land. Large estates had more forest land, pastures, and meadows than small ones. Nevertheless, the estates exceeding 140 acres included more than 40 per cent of the arable land within the new frontiers of Hungary, and at the same time there was a numerous group of peasants with very small lots of arable land—more than half a million. Furthermore, there were more than 800,000 agricultural laborers who had no land at all.

Most landlords in Hungary were not only the proprietors of land, but they themselves organized and directed the agricultural production on their land, with their

[1] D. L. Buday, *Die kampfreichen Jahre ungarns* (Budapest, 1922), p. 56.

own livestock and implements and machinery. Or if the properties were rented, they were rented as a whole and agricultural production was organized by the tenants.[1] Comparatively little land was rented to small croppers, a situation strongly in contrast with that in pre-war Roumania, where large estates were often rented to small croppers.

Since the war the distribution of land properties in Hungary has changed comparatively little. Hungarian land reform was much less radical than Roumanian. The radical agrarian reform proclaimed by the first revolutionary government (that of M. Karolyi) early in 1919 was not effected, because this government was overthrown by the communists. The communistic régime lasted only a short time. The agrarian reform which was really effected was proclaimed by a conservative government in 1920. The landlord class has remained strong in Hungary.

Radical division of larger estates was not the purpose of this reform. The agrarian law of 1920 purposed to give small holdings to the agricultural laborers who were so numerous in Hungary. But the size of these holdings was fixed so low, only 4.2 acres, that allotment to laborers did not substantially change their situation. Laborers did not become farmers, but continued to remain laborers, though a little more attached to definite localities through their holdings of small lots of land with their own houses.

[1] The larger percentage of large estates rented was among the "tied" estates, that is, estates removed from free purchase and sale (*fideikomisse*). In Hungary more than a fourth of the arable land belonging to the estates larger than 70 acres (in total, about 2.5 million acres) was held in "tied" estates. The owners of this land cannot sell it; hence the number of rented estates was larger among the "tied" estates than among estates free for sale.

[2] Dr. Ch. Schandl, *La politique et la reforme agraire en Hongrie* (Budapest, 1927). The author of this book is the State Secretary in the Ministry of Agriculture, and his study may be regarded as an official report on the reform.

[3] Konkoly Thege, "Les conditions de propriétés fonciers et l'amendement à la loi agraire en Hongrie," *Revue hongroise de statistique,* III, October 1925, pp. 386–401.

[4] And now it is very near its end, because the applications for land must be presented not later than 5 years after the beginning of the reform. After December 7, 1925, the tribunal for regulation of land property could not order new proceedings for the expropriation of land.

It is true that the agrarian law of 1920 was designed also to increase the size of such peasant holdings as were too small to permit the organization of production upon them. The law purposed to increase these up to the middle-sized holdings in each region, though not to exceed 21 acres. But this last purpose of the agrarian reform was not achieved. At the beginning of 1927 there had been expropriated (or bought according to the right of pre-emption) about 1.4 million acres of land. This land was distributed among about 400,000 holders.[2] Thus the average allotment was only 3.5 acres, which is smaller than the lot fixed for the agricultural workers. Most of this land was allotted to the agricultural laborers; hence it is clear that not much land went to increase the small holdings of peasants.

It was estimated[3] that at the end of the reform about 2.4 millions of acres would be expropriated and that two-thirds of the agricultural laborers would become landholders. If such expropriation should really be effected, the middle-sized and large holdings exceeding 140 acres will include about 45 per cent of the total land, as against 54.2 per cent in 1913 and 49.8 per cent in 1925. Of this 45 per cent, two-thirds will belong to the very large estates exceeding 1,400 acres.

Thus the agrarian reform in Hungary, even when fully effected, will not considerably change the division of rural property.[4] One-third of the total area will be retained by larger estates, and 15 per cent by estates from 140 to 700 acres. About 10 per cent of the total land will change ownership. The principal change will be that a majority of the agricultural laborers will be owners of small lots of land. This cannot substantially change the organization of agricultural production in Hungary. Large agricultural enterprises will continue to be one of the principal factors in agricultural production in Hungary, especially because Hungarian landlords do not rent their land so extensively to small croppers as Roumanian landlords. The comparatively moderate character of the Hungarian agrarian reform and its limited extent certainly interfered less with agricultural production in Hungary than did the radical Roumanian reforms with Roumanian.

JUGO-SLAVIA

Agrarian conditions in Jugo-Slavia are very various in different parts of the country, for the present territory of Jugo-Slavia is composed to a considerable extent from territories which previously belonged to several other countries.

In the northern level region, north of the Danube and Sava (Voivodina and Slavonia-Croatia), the agrarian situation was more similar to that of Hungary, because this part of Jugo-Slavia once was a part of Hungary. This was the border zone of Hungary; it was occupied for a long time by Turkey. After the liberation, certain parts were colonized by different peoples. From the south entered the Serbs, from the east Roumanians, from the north Hungarians. German colonists also were brought here. The region of Voivodina (formerly Banat and Backa) is a region of very mixed population. The descendants of these colonists formed large groups of middle-sized landowners, and for this reason extremely large estates do not predominate here to such an extent as in other Hungarian regions farther to the north.

Old Serbia, after its liberation from Turkey, was always typical peasant country. Larger estates practically did not exist there. The census of 1897 mentions only 3 estates exceeding 750 acres, and less than 100 exceeding 250 acres. Only the small and middle-sized peasant holdings, smaller than 125 acres, were numerous.

In new southern Serbia, which until recently belonged to Turkey, in Bosnia and Herzegovina, the agrarian relationships were much influenced by the Turkish agrarian system. There a considerable part of the peasantry, until the recent agrarian reform in Jugo-Slavia, continued to be in a condition bordering on serfdom (Kmets). The Austrian census of 1910 shows that more than a third of the peasants in Bosnia and Herzegovina were Kmets. Little attention needs to be given to the distribution of rural property in these regions of Jugo-Slavia, for this region is of small importance from the point of view of agricultural production.

The agrarian conditions in Dalmatia, on the coast of the Adriatic Sea, show the influence of the old Venetian agrarian system, the so-called Colonat system.

Upon its formation the new Jugo-Slavian government was thus faced by a variety of agrarian relations in different regions of the country; consequently the agrarian reform started by the government had to solve many different problems. In southern Serbia, in Bosnia and Herzegovina, and Dalmatia, the reform purposed to abolish the feudal rights which still existed in these provinces. In the northern regions agrarian reform involved the partition of the large estates and the creation of middle-sized and small peasant holdings; here we meet agrarian reform in its modern meaning. It had for its purpose to change the existing system of organization of agricultural production, and to replace large agricultural enterprises by small and middle-sized holdings. In the southern regions it was not a question of changing the organization of production but only of liquidating the obligations of the serfs based on the feudal rights of landlords.

As we have seen, the predominance of large estates was not so great in the northern regions of Jugo-Slavia as in Hungary or in Roumania. In Croatia and Slavonia the large estates exceeding 280 acres included about one-fourth of the area belonging to private owners.[1] Half of this area belonged to small owners (up to 28 acres), and a fourth fell within medium-sized farms of 28 acres to 280 acres.

Concerning Voivodina (Banat and Backa), it is difficult to give separately the statistics of the distribution of rural holdings, because this region includes only a part of corresponding pre-war Hungarian districts. It was estimated[2] that in the region corresponding to Voivodina the estates exceeding 140 acres included about 1.6 million acres of land, of which about 1.2 million acres were agricultural land. The arable area of these estates was about 0.8 million acres, and constituted about 23 per cent of the total arable area of Voivodina.

In Slovenia, the extreme northwestern

[1] Statistics of the official Hungarian census of 1895 did not include state land, community pasture, etc. After this time until the war, the relations changed but little, as is shown by the census of 1910. We employ the census of 1895 because it gives more details.

[2] Data concerning large estates in Hungary in 1910, compiled by M. Rubinek, as quoted in M. Jvsic, *Les problèmes agraires en Yougoslavie* (Paris, 1926), pp. 156–58.

part of Jugo-Slavia and a rather mountainous region, large estates included perhaps only 5 or 6 per cent of the arable area.[1]

Agrarian reform was applied throughout the northern area. The large estates, exceeding certain sizes which were fixed differently for different regions, were to be expropriated in part. The quota of land to be retained by owners increased from west to east. In Slovenia, where arable lands were scarce and large estates not numerous, this quota was fixed at 187.5 acres of arable land or 500 acres of all kinds of land. In Croatia this quota was 250–375 acres of arable land or 750–1,000 acres of land of all kinds. In the eastern plain region (Slavonia and Voivodina) the quota of non-expropriable area was 750 acres of arable land or 1,250 of all kinds of land. Lands in excess of these quotas were to be expropriated. Thus the maximum size of the estates was fixed at 750 acres of arable land. For owners leasing their land, the quota which could be retained was fixed lower.

At the end of 1927 in the northern region of Jugo-Slavia, expropriation was applied to 843 estates with a total area of about 3 million acres, of which more than 1.5 million acres were agricultural land, and about 1.2 million acres arable land.[2]

About 770 thousand acres of agricultural land were expropriated from these estates and divided among more than 200,000 small holders. Large estates thus lost about half of their agricultural land. But agrarian reform did not create middle-sized holdings. The land was allotted to persons who did not have any land (preferably to former soldiers of the Serbian army, who obtained from 10 to 12 acres per family), or to small landholders who previously owned very small lots.

Nearly 90 per cent of the people who obtained land were from the local rural population. The others were colonists from other regions. As a criticism of agrarian reform, it has been mentioned that many of these colonists were former soldiers who had not been agricultural workers previously and for this reason could not well utilize the land which they obtained. Again, the execution of the land reform was not very well organized. There was much uncertainty in allotments; land was not given at once in property but was rented, before conditions of payment had been definitely determined by law.

Since in the northern part of Jugo-Slavia the number of medium-sized holdings was considerable before the land reform, and the reform did not interfere with their ownership, one may conclude that the Jugo-Slavian land reform did not disturb agricultural production in the principal agricultural region of Jugo-Slavia so much as did the Roumanian reform. The extent of the agrarian reform in the northern region also was much more restricted than in Roumania. Of about 12.5 million acres of agricultural land in the northern area of Jugo-Slavia (Voivodina, Croatia, Slavonia, and Slovenia), less than 0.8 million acres were expropriated, that is, only 6–7 per cent of the total agricultural area of the region.

In Old Serbia, the second important agricultural region of Jugo-Slavia, agrarian reform has not been applied at all, because there were no large landed properties.

Bulgaria

Bulgaria, after its emancipation from Turkey, was a country of small and middle-sized peasant properties, practically without large estates. The estates exceeding 250 acres constituted in 1908 only 5.5 per cent of the privately owned land. The average size of these properties was below 700 acres. Furthermore, this group of larger estates not only occupied only a small percentage of agricultural land, but its significance was continually decreasing. Comparison of two consecutive censuses (1897 and 1908) shows a decrease in the area falling within large estates from 6.5 per cent to 5.5 per cent. The distribution of rural properties in Bulgaria in 1908 is shown in Table 6.

The greater part of the total area was held in small and middle-sized farms. An unfavorable characteristic of the Bulgarian agrarian system was the existence of too many peasants who had only very small lots of land. About a half of all properties were below 5 acres in size; and these properties were subdivided into many parcels

[1] M. Jvsic, *op. cit.*, p. 165.

[2] Data furnished by the Ministry of Agrarian Reform of Jugo-Slavia.

located in different places. On the average each estate was divided into more than 10 parcels, and each parcel averaged only 1.2 acres. The rural population had no alternative in industrial work, because industry is only slightly developed in Bulgaria.

TABLE 6.—DISTRIBUTION OF RURAL PROPERTIES IN BULGARIA, 1908*

Size of estate (*acres*)	Number	Percentage of total	Area (*acres*)	Percentage of total
Less than 5	424,898	45.5	794,604	6.9
5–25	386,728	41.4	4,830,503	42.3
25–75	111,632	12.0	4,174,486	36.5
75–250	9,173	1.0	1,002,378	8.8
More than 250	936	0.1	628,489	5.5
Total	933,367	100.0	11,430,460	100.0

* Popoff, *La Bulgarie économique* (Sofia, 1921), p. 97; and N. V. Dolinsky, *Problems of Bulgarian Rural Property*, 1928 (in Bulgarian), p. 17.

Absence of large estates, it seems, precluded any agrarian reform having for its purpose the division of rural properties. Notwithstanding this, a radical farmers' government of Bulgaria proclaimed land reform in 1921. It was declared that nobody might keep more land than he could work with his family, at most no more than 75 acres; and landed properties in excess of this quota must be expropriated. If the proprietor did not work his land himself, he could not keep more than 10 acres. Expropriated land was to be divided among tenants, agricultural laborers, and peasants who had too small plots.

It was considered a possibility that expropriation might involve about 600 thousand acres of agricultural land: 175,000 acres from landlords, 375,000 acres from state domains, and about 60,000 acres from parish grounds and pastures. Actually about 170,000 acres were expropriated from private estates and about 50,000 acres of parish lands; but it was impossible to expropriate much land from the state domains for agricultural purposes, because state lands were not good for agriculture.[1]

The more conservative government which replaced the radical peasant government in 1924 altered the law of agrarian reform, but retained the general principle that estates exceeding 75 acres would have to be expropriated to the extent of their quota excess. But the quota for lands which owners could retain if their farms were well organized was increased to 375 acres. In practice, the lands expropriated by the radical government were returned to owners and agrarian reform was liquidated. Hence the distribution of rural properties remains the same as it was previously.

The radical agrarian reform of 1921 had only one important consequence. It disorganized temporarily the agricultural production on the estates which had undergone expropriation, and introduced uncertainty in agrarian relations. However, agrarian reform could not interfere very much with agricultural production because the larger estates in Bulgaria were so small a percentage of the total agricultural area.

All Danube countries passed through the agrarian reforms. Some of the reforms, as has been shown above, were very radical and greatly changed the distribution of rural properties and the organization of agricultural enterprises of the country, as was so in Roumania. Others interfered in the system of agricultural production only in certain regions of the country, as in northern Jugo-Slavia. The Hungarian reform was comparatively moderate and did not substantially change the previous agrarian system; large rural property continues to be the predominating factor after the reform as before it. Finally, the Bulgarian agrarian reform was practically nullified, and had only a temporary effect.

Of course all of these agrarian reforms, aside from whatever definite effect they might have on agricultural production in the future, interfered greatly with agricultural production during the time when they were in the process of execution. Each change of property is accompanied by a decrease of productive activity until the new owner adjusts himself to the new conditions. The transfer of large areas of agricultural lands into the hands of small holders, poor in capital, especially would decrease productivity at least for the first harvests. And such was the event in the Danube countries.

Again, owners of large estates had to ad-

[1] M. Tz. Bouroff, *La reforme agraire en Bulgarie* (Paris, c. 1925), pp. 102–09.

just themselves to new conditions of production on a smaller scale. Especially was this true when they did not obtain prompt payment for their expropriated land, for use in the reorganization of their enterprise on their remaining land. And these payments for expropriated lands not only have not been promptly met, but they have not been met in full. The compensation for expropriated lands was fixed on the basis of the pre-war value of lands or pre-war rents paid for them (Hungary excepted); but, what was more important, this value was paid in depreciated monetary units. For instance, the average recompense for expropriated lands in Roumania was fixed at about 2,000 lei per hectare, or four dollars per acre of good plough land. This was not more than 10 per cent of its value. In Jugo-Slavia the owners did not receive payment even in so small a measure, because until the prices were fixed by law they obtained only rent for expropriated land, and this was sometimes less than the taxes which they had to pay on these lands.[1]

We shall later discuss certain definite results of the agrarian reforms in the Danube countries, but at present it is necessary only to keep in mind these general consequences attending the execution of the reforms.

III. AGRICULTURAL ORGANIZATION AND PRACTICES

Crops and Livestock

The most marked characteristic of the evolution of agriculture in the Danube countries during the second half of the nineteenth century was the continuously increasing importance of plant crop production in comparison with livestock breeding. This evolution was accomplished earlier in Hungary, but it continued longer in the other countries. In the middle of the nineteenth century livestock breeding was still the principal agricultural activity in Roumania. Animals and animal products were the main objects of export, and land was mainly utilized as pasture. Pastoral activity and extensive livestock breeding, especially horse breeding, were the branches of agriculture which gave surplus products for export. Plant crop cultivation had for its purpose the satisfaction of home needs. In Serbia the preponderance of pastoral activity was still greater. In the 'eighties of the last century animals and animal products constituted more than half of the total exports of Serbia, and grain was produced principally for home consumption.

Only since the development of a better transportation system, particularly by improvement of navigation on the Danube (the Danubian Commission for regulation of navigation was convoked in 1856) and growth of the grain market in western European countries, was plant crop production for export established in the southern Danube countries.

After that time the importance of crop production increased more and more. In all the Danubian countries crops occupied larger areas and pasture areas decreased. In Roumania before 1870 crop land constituted less than 20 per cent of the total area; by 1890 it reached a third of the total area; by 1905, 40 per cent; by 1912, 47 per cent. The same evolution occurred in Bulgaria. In 1889 the arable land was only 14.5 per cent of the total area; in 1899 it was 29.2 per cent; and in 1911 it was 37.2 per cent.[2]

In Hungary, as we have said, the evolution from pastoral to crop production was accomplished earlier, during the early part of the nineteenth century. However, the crop area in Hungary continued to increase rapidly also in the second half of the century. In 1850 it was only 20 million acres of plow land; in 1870 it was 24.5 million acres; and in 1895 it was 30.1 million acres. Within 45 years the quantity of arable land increased more than 50 per cent, while the magnitude of other branches of farming changed only a little. The extension of plow land was at the expense of meadows and pastures, yet the loss of the latter

[1] Dr. J. Matl, *Die Agrarreform in Yugoslavien* (Berlin, 1927), p. 129.

[2] K. Popoff, *La Bulgarie économique*, p. 161.

was again compensated by the draining of swamps through embanking the rivers.[1]

The continuously increased crop area was utilized mainly for grain production. Large estates and middle-sized farms produced more and more grain because foreign markets increased the demand for grain exports and rendered grain production profitable. Small peasants increased their grain production because an increasing rural population needed more and more grain for consumption. As a result pasture land decreased, and livestock breeding met with many difficulties.

Livestock raising in the Danube countries (with the exception of Hungary) existed only in extensive pastoral forms. Intensive livestock breeding, with utilization of the feed produced in the fields, was not often found in the southern part of the Danube basin. For this reason a decreasing percentage of pasture area signified a crisis in livestock production. In certain regions, for instance in Old Roumania, the problem of community pastures became one of the most insistent problems of agricultural reform, because the pasture area of the small peasantry became so limited that they could graze their livestock only on pasture rented from landlords. During the recent agrarian reform in Roumania about 2.5 million acres of expropriated land was distributed to the communities as pasture. Need for pasture land was one of the gravest problems.

Everywhere the competition for the land between crops and livestock was resolved in favor of crops. Even in such countries as Bulgaria and Serbia, where many mountainous regions are not fitted for crops, the amount of livestock began to decrease even before the war, in Serbia absolutely, in Bulgaria relatively in comparison with population growth.

Extensive livestock raising continued to be the most important branch of agriculture only in a limited region of the Danube basin in Bosnia and Herzegovina, in southern Serbia, and in other mountainous regions. On the other hand, livestock raising took intensive forms in some regions north of the Danube. Intensive swine raising developed in northern Jugo-Slavia (Voivodina, northern Serbia, Croatia) and in Hungary. Intensive cattle raising developed in the northwestern part of Jugo-Slavia (Slovenia) and in western Hungary, as well as in Transylvania.

Crop production finally became more important than animal husbandry in the Danube basin as a whole. This may be illustrated by the fact that exports of animals and animal products were of relatively smaller importance than grain exports. In Bulgaria, exports of livestock and livestock products during the 25 years preceding the war were about 15 per cent of the total exports in value, while the exports of grains were from two-thirds to three-fourths of the total exports. Pre-war Roumania had no net export of animals and animal products, but imported during the ten years before the war four times more animals and animal products than she exported. It is true that the relative importance of the exports of livestock from Serbia continued to be considerable until the war, making in value from 30 to 40 per cent of her total exports. Pre-war Hungary, which always had made considerable exports of animals, began to develop her livestock products in more intensive forms. But in all of these countries grain production gradually became the leading branch of agriculture and competed successfully for land.

In spite of the mountainous character of the Balkan countries, the percentage of land under pasture before the war was and still continues to be comparatively small. For all these countries it runs about 10 per cent and is continuously decreasing. In Bulgaria, pasture land decreased from 2.7 million acres in 1889 to 2.2 million acres in 1908. In pre-war Roumania, the area in pastures and meadows decreased from 3.7 million acres in 1905 to 3.5 million acres in 1917. The largest percentage of pasture is found in western and southwestern Jugo-Slavia, where the mountainous character of the country makes it unfit for crops. Parts of these pastures on the karstlands

[1] From 1850 to 1880 the non-productive land in Hungary decreased from 12.6 million acres to 4.4 million acres, or from 15.8 to 5.5 per cent of the entire country. Until the 'eighties the productive land increased, in consequence of the great embankment of rivers and drainage operations. See J. Jekelfalussy, *The Millennium of Hungary* (Budapest, 1897). Hence, in Hungary during the second half of the nineteenth century, there was not such an absolute decrease of pasture and meadow, as there was in Bulgaria and Roumania.

(limestone land with deep ground water) are of most inferior quality.

The percentages of natural meadows are even smaller. They range from 3.1 per cent in Bulgaria to about 7 per cent in Hungary and Jugo-Slavia; in Roumania the figure is 4.5 per cent. Since the animal industry in the Danube basin with few exceptions is extensive in form and, as we shall see later, forage production there is very limited and grain is used only in a small degree for animal feed, such low percentages of land in pasture and meadow show that livestock has only a limited importance.

The extensive character of the livestock industry in the Danube basin may be seen also from the distribution of livestock of different kinds. Sheep raising in the Danube basin is comparatively more important than in countries with an intensive type of agriculture. The number of sheep per 1,000 hectares of total area and per 1,000 of population in the Danube basin before the war was larger than in such countries as Germany, Austria, France, and Denmark. It was especially high in Bulgaria, though Roumania and the southern part of Jugo-Slavia also had large numbers of sheep. The northern regions of Jugo-Slavia and all of Hungary have comparatively few sheep, but a larger number of swine and cattle. This shows the more intensive character of animal industry in these regions.

Sheep raising in the Danube basin is usually not concentrated in special enterprises with large flocks of sheep, though this was practiced in some measure on the large estates in Hungary. Here the landlords raised Merinos for fine wool. But in Bulgaria and Roumania sheep were raised mainly by peasants in small flocks. Practically every peasant had a flock of 10 to 50 sheep. A herd of more than 500 sheep was very rare. Since sheep raising was dispersed among small peasant farms, it was not much localized in special regions nor in the mountains. Formerly Dobrogea was famous for its sheep herds, but now the increasing crop area has limited sheep raising there considerably.

Swine raising for market, especially for export, was fairly well developed in Hungary and northern Jugo-Slavia, where corn was used in considerable measure for fattening swine. In Roumania swine are raised chiefly in Transylvania and Bukovina, less so in Moldavia, Bessarabia, and Dobrogea. In Bulgaria swine raising was more for home consumption and was only slightly developed, much as in southern Jugo-Slavia.

Cattle raising in the Danube basin has been less developed than in countries with intensive agriculture, which have considerably more cattle per acre of land than the Danube countries, and sometimes also more per 1,000 of population. The extensive character of the Danubian cattle industry is especially well indicated by the slight development of dairying. The percentage of cows in the cattle herds is very small in the Danube countries; in Bulgaria it is as low as 27 per cent, and the same in old Roumania. Only in Hungary, in Transylvania, in Bucovina, and in northwestern Jugo-Slavia is the percentage larger. Even here it is generally not higher than 40 per cent. The reason is that in the Danube countries oxen are extensively used for field work. In Bulgaria, Old Roumania, and southern Jugo-Slavia grown oxen are more numerous than cows, and also than horses. On the other hand, since cattle raising is more for beef than for dairy purposes, a larger percentage of young cattle is kept.

Cattle in the Danube basin are raised extensively, and very little grain is fed to them. They are kept the larger part of the year on pasture. During the winter they are fed rather rough feed, straw and corn stalk, but not ensilage. Cattle are fattened by grazing.

The war resulted in a considerable decrease in the numbers of livestock in the Danube basin, as it did in other European countries involved in the war. The number of cattle decreased from 15 million before the war to 14 million in 1921; the number of swine decreased from 11.0 million to 9.5 million; and the number of sheep from 32.6 million to 26.0 million.[1]

But, what is more significant, the decrease in the number of livestock did not stop with the end of the war. A comparison of the number of livestock in the four Danube countries in 1921 and in 1925 shows that cattle decreased during these five years more than they had done during the war—

[1] See Appendix Table VIII for data on numbers of livestock.

from 14.0 million to 12.9 million. The number of swine also decreased a little, from 9.5 million to 9.1 million. The number of horses increased, and the number of sheep increased about 5 million, from 26.0 million to 30.9 million. It is especially remarkable that the most extensive branch of animal industry, sheep raising, has recovered more than any other. The difficulties of the extensive livestock industry which began in the Danube countries before the war continued thereafter. Perhaps they were intensified by difficulties in international trade, which were especially important in their bearing on the export of animals from the Danube countries. Many regions, northern Jugo-Slavia and Transylvania especially, which were before the war within the old Austro-Hungarian monarchy and marketed their livestock on the markets of industrial Austria and Bohemia, are now less able to export there on account of the new frontiers. It is interesting also to observe that many authorities expected an increase of the livestock population as the result of land reform, which created many small holdings which are regarded as more favorable to livestock production. But in Roumania, where the agrarian reform was most radical, only the number of sheep is larger than before the war. The number of cattle is over 0.6 million less than in pre-war years, 5.0 million in 1927 as against 5.6 million before the war; and the number of swine is also a little less.[1] The largest decrease of livestock of all kinds was in Jugo-Slavia, where it has continued since the war.

Crop Systems and Competition of Different Crops for the Land

We have seen that in the competition for land between crops and livestock the former was the victor. Crop land increased continuously as more and more pasture was used for crops, except perhaps during the war period. This process was especially marked on the Danubian plain. Here the plow land comprises two-thirds or more of the total area, and a preponderance of plant crops is typical.

But the plow land was utilized in extensive forms. The crop systems in the Danube basin were as extensive as its livestock industry. As a measure of the intensity of the crop system we may use (1) the degree of utilization of plow land in crop and in fallow, and (2) the diversification of farming.

From the point of view of utilization of plow land for crops, the intensity of Danubian agriculture is considerably advanced. To leave plow land unsown or in fallow is not now very common in the Danube basin. The percentage of fallow to the total area of plow land is high only in Bulgaria, and in the southern part of Jugo-Slavia (Bosnia and Herzegovina, and southern Serbia). Over the period 1925–27, land in fallow constituted 3.4 per cent of all plow land in Roumania; 4.8 per cent in Hungary; 5.4 per cent in Jugo-Slavia; and 20.7 per cent in Bulgaria.[2] In Jugo-Slavia, exclusive of the territory of Bosnia, Herzegovina, and south Serbia, where fallow occupies more than 10 per cent (in certain regions of Bosnia as high as 20–30 per cent), the percentage of fallow in other agricultural districts, especially in Voivodina and Slovenia, is exceedingly low, often less than 1 per cent and always below 3 per cent.

In Bulgaria fallow constitutes a large percentage of the plow land, mainly in hilly regions. On the level lands adjacent to the Danube, the percentage of fallow is considerably smaller than the average for the country. The area under fallow decreased considerably in Bulgaria during the two or three decades preceding the war; in 1897 the percentage of fallow was as high as 36.8 per cent, and in 1911 it was 21.3 per cent. Thus in 1897, with a little more than a third of the total plow land in fallow, the three-field system with one field under fallow was typical for all Bulgaria. Now the better and more level lands near the Danube are utilized more intensively, and the three-field system is not common throughout Bulgaria.

In Hungary the largest percentage of fallow is in the northern and northeastern hilly regions; here fallow occupies more than 10 per cent of the plow land, some-

[1] For Roumania it was expected particularly that transfer of land to small holdings would increase the number of livestock because generally large estates had considerably less livestock in proportion to their land than was true of small peasant holdings. A large part of the land in large estates was plowed with peasant livestock.

[2] See Appendix Table I for data on land utilization.

times 15 per cent or more. The three-field system is very common here. But for Hungary as a whole the extent of fallow is not great. The percentage of fallow in Hungary has declined during the last 40 or 50 years. In 1870–80 the situation in Hungary was about the same as it is now in Bulgaria: the percentage of fallow in 1870 was 22.6; in 1880, 18.7 per cent; in 1895, 14.2 per cent.

In Roumania, fallow is likewise rare. It occurs most often in Dobrogea and in some of the mountainous regions of Transylvania. There is an especially low percentage of fallow on small holdings in Roumania, where peasants had so little land that they needed to utilize all of it under crops.

Thus the traditional three-field system of agriculture remains only in limited regions of the Danube basin, mainly in the southern part of Bulgaria and Jugo-Slavia. The utilization of plow lands has become much more intensive than it was under the traditional three-field system.

It is otherwise with diversification of farming. The crop system is extremely inelastic and unvarying in the Danube countries. It may be called a cereal system. With few exceptions cereals occupy more than 80 per cent of the total crop area in the Danube basin; in three of four countries it is higher than 85 per cent. Over the period 1925–27, cereals occupied 87.9 per cent of the total crop area in Roumania; 87.2 per cent in Bulgaria; 87.0 per cent in Jugo-Slavia; and 76.6 per cent in Hungary. Thus only in Hungary was the percentage of crops other than cereals as high as 23.4 per cent; but on the Danubian plain in Hungary cereals occupy 80 per cent of the total crop area. It is in the region of more diversified farming of Hungary, the trans-Danubian part of the country, that cereals occupy only 70 per cent of the crop area. Another region of diversified farming in the Danube basin is the northwestern part of Jugo-Slavia, Slovenia and Croatia. In these two regions the process of diversification is more advanced; here roots, tubers, and forage crops occupy a considerable percentage of the crop land. Here also the livestock industry utilizes more of the products of the crop land and is more intensive in its organization. In other agricultural regions of the Danube basin, the percentage of root, tuber, and forage crops is extremely low. Throughout the basin the crop system is a monotonous, uniform cereal system, with the percentage of cereals ranging from 85 to 90 per cent—a distinctly extensive system of agriculture.

One circumstance, however, makes the crop system of the Danube basin less extensive than might be expected from so great a preponderance of cereals. This is the important rôle of corn among the several cereals produced. About a third of the total crop area is under corn, in some countries about 40 per cent. As cultivation of corn requires more labor and better plowing and hoeing of the land, the importance of corn among cereals of the Danube basin makes its crop system more intensive than, for instance, Russian farming in regions where only small grains are grown. In certain regions of the Danube basin, corn occupies as much land as all the other cereals together.

The Danube basin is the most important corn-producing region in Europe. Elsewhere corn is widely grown only in Italy. This importance of corn is the specific characteristic of Danubian agriculture. Corn and wheat are two crops which distinguish the crop system of the Danube basin. Table 7 shows, for 1909–13 and 1925–27, the areas sown to the several principal cereals in the four Danube countries together. Corn and wheat occupy more than 70 per cent of the total cereal area, and more than 60 per cent of the total crop area (in 1925–27, 60.8 of the total area

TABLE 7.—AREAS UNDER CEREAL CROPS IN FOUR DANUBE COUNTRIES, 1909–13 AND 1925–27*

Crop	1909–13		1925–27	
	Thousand acres	Percentage	Thousand acres	Percentage
Wheat	19,618	37.1	18,912	35.4
Corn	18,114	34.2	19,743	37.0
Barley	6,274	11.9	6,651	12.5
Oats	4,734	8.9	4,698	8.8
Rye	4,168	7.9	3,376	6.3
Total	52,908	100.0	53,380	100.0

* Data for 1909–13 as compiled by U.S. Department of Agriculture. Data for 1925–27 from the official statistics of agriculture for corresponding countries; see Appendix Table I. All figures for post-war boundaries.

sown to crops). The other three cereals together have less importance than either corn or wheat. Such a relationship is characteristic of each of the Danube countries. In some of them wheat ranks first (Hungary and Bulgaria); in others corn (Roumania and Jugo-Slavia). But always these two crops are far ahead of other cereals. Table 8 gives the data by countries. The

TABLE 8.—CEREAL CROP ACREAGES IN THE DANUBE COUNTRIES, 1909–13 AND 1925–27*

(Thousand acres)

Crop	Roumania	Jugo-Slavia	Hungary	Bulgaria
	Pre-war (1909–13)			
Wheat	9,515	3,982	3,712	2,409
Corn	9,644	4,786	2,192	1,492
Barley	3,378	1,058	1,322	516
Oats	2,119	1,358	849	408
Rye	1,286	732	1,608	542
Total	25,942	11,916	9,683	5,367
	Post-war (1925–27)			
Wheat	8,014	4,495	3,796	2,607
Corn	10,057	5,434	2,666	1,586
Barley	4,134	931	1,035	551
Oats	2,758	917	689	334
Rye	697	516	1,703	460
Total	25,660	12,293	9,889	5,538

* Sources same as in Table 7.

preponderance of corn in Roumania and Jugo-Slavia, even in comparison with wheat, may perhaps be explained partially by climatic conditions; but in both of these countries corn is the principal human food, while in Hungary and Bulgaria the rôle of corn as human food is only secondary.

Preponderance of corn and wheat characterizes the crop system everywhere in the Danube basin. Other cereals appear in larger percentages only in the regions which for one reason or another are not favorable for these crops. Thus barley is widely grown in certain regions of Roumania; more than 60 per cent of the total area of barley in the Danube basin is found in Roumania. Barley takes first place among the cereals on the steppes of southern Bessarabia, and also on the Baragan Steppe in the eastern part of the Danubian plain, in northern Dobrogea. It is second to corn but is above wheat in Moldavia. These localities constitute the driest regions in the Danube basin. It is a little dry for wheat, and barley as the earliest maturing crop here replaces wheat.

In Jugo-Slavia also barley is widely grown in localities which are less favorable for wheat. The two regions with comparatively large percentages of barley are the Karst region in western and southwestern Jugo-Slavia, with deep ground water and few rains in the spring and summer, and southern Serbia, where the rainfall is less than elsewhere in Jugo-Slavia. There is not much barley in Bulgaria, most of it in southern Bulgaria and in the eastern part of the Danubian level land, near Dobrogea.

Similarly, rye also is of greater importance in certain regions less favorable for wheat. The largest part of the Danubian rye crop (in 1925–27, a little more than one-half) is found in Hungary. Here rye is more frequent in the northern and northeastern colder regions that are less favorable for corn and wheat. On the Danubian plain in Hungary we find a large percentage of rye only in regions with light sandy soil not favorable for wheat (between the Danube and the Tisza, south of Budapest, and in the northeastern part of Hungary on the Tisza). In Roumania likewise we find generally very little rye, and only where conditions are not favorable for wheat, as in northern Bessarabia, in Bucovina, and in certain regions of Transylvania. Where the climatic and soil conditions are favorable for wheat and for corn, these two crops are allotted all the area possible. Other cereals are cultivated only in minimum quantities. In competition for land, wheat and corn triumph always when climatic and soil conditions are favorable.

It is difficult to say whether there is competition for land between corn and wheat, or whether they are complementary one to the other. As we shall see later, the principal crop rotation in the Danube basin is corn followed by wheat. Where corn and wheat supplant all other crops, as on the Danubian plain in Jugo-Slavia and Roumania, they cannot compete for land between themselves, because a one-crop system is altogether irrational. In certain re-

gions, it is true, corn is planted after corn several years in succession; but this is an exception rather than a general rule. Generally plow land is divided between these two crops in equal parts.

In the Danube basin as a whole we find that corn and wheat occupy equal areas, about 30 per cent of the total crop area being assigned to each. Before the war, wheat occupied a little larger area than corn; after the war, on the contrary, corn ranked first. It is difficult to say what general tendency may be expected in the future.

Before the war the wheat crop area increased in Roumania more rapidly than corn. Wheat as a cash crop received more impetus from the market than corn, and large estates producing for market increased wheat production over that of corn. For the period from 1867–71 to 1911–15 the wheat crop area in Roumania more than doubled, increasing by 119 per cent. The crop area under corn also increased greatly, but much less than the area under wheat, or 93 per cent. At the same time, in Bulgaria the corn area increased much more rapidly than wheat; from 1897 to 1911 the area under corn increased 80.7 per cent and the area under wheat only 27.5 per cent. In 1897 the wheat crop in Bulgaria occupied a fifth of the cereal area; in 1911, a fourth.

After the war the wheat area in Roumania did not recover to the pre-war level, but the corn area in 1925–27 was larger than before the war. In other countries also the corn area after the war became larger in comparison with the pre-war area, in spite of the fact that since 1920 the wheat area has increased more rapidly than the corn area. From 1921 to 1927 the wheat area in the four Danube countries increased 42 per cent, the corn area 27 per cent.

The decrease of wheat production during the war was greater than that of corn. The area under wheat in 1920 was more than 30 per cent below the pre-war (1909–13) level, while the area under corn decreased only about 11.5 per cent. This occurred because wheat was more of a cash crop and especially more of an export crop than corn, which was used more for home consumption (in Roumania for men, in Hungary for livestock); and the disorganization of exports naturally influenced wheat more than corn. Again, wheat was produced more on large estates than by small holders, a relationship especially typical of Roumania. Before the war more than half of the Roumanian wheat crop was grown on large estates, while these produced only a sixth or a seventh of the total corn crop in Roumania. Corn required more labor than wheat; it was further the principal food of the peasantry; consequently it was produced chiefly by peasants. On large estates the disproportion between wheat and corn crops was so large that estate owners required croppers to produce corn on rented land, and so to prepare land for wheat which landlords themselves produced in the next year. Since more wheat was produced on large estates, worked with hired hands, war disorganized wheat production more than corn production.

Agrarian reform after the war transferred large areas of land from large estates to small holders; and it is possible to expect that shifting from wheat to corn may tend to be permanent, especially in Roumania, where the land reform was most radical. Perhaps this may occur also in northeastern Jugo-Slavia, though here the shift to corn may be expected to be less pronounced because in Voivodina corn is not used to any considerable extent for human food and is rather a cash crop like wheat, or an animal feed. Furthermore, in Voivodina a smaller percentage of land passed from large estates to small holders.

Generally speaking, in the Danube basin there exists a certain equilibrium between corn and wheat. These two crops are the foundation of the agricultural system, and are the basis of the prevailing crop rotation.

Crop Rotation

The principal rotation system in the Danube basin is the two-field system, a rotation of corn and of wheat. This is the only system characteristic of all the Danube region. It is especially typical for Roumania and Jugo-Slavia, where the corn area slightly exceeds the wheat area; but it is also typical of Bulgaria and of certain regions of Hungary, especially the south. Authorities in agricultural economics in these countries

accept this quite openly. Jonescu-Sisesti[1] says that the two-field rotation of corn and wheat is the only broadly accepted rotation system in Roumania. Professor J. S. Mollow, speaking of the Bulgarian rotation, says that if it is possible to speak of any generally accepted rotation system, it is a two-field wheat and corn rotation which is typical for the Danubian region of Bulgaria. The same is true of the Danubian plain in Jugo-Slavia, as is sufficiently evident from the fact that corn and wheat occupy more than 90 per cent of the total cereal area, and the area under wheat is equal to that under corn. In Hungary the two-field rotation is often applied on the Danubian plain, especially in the south.

Though the two-field rotation is that most generally practiced in the Danube basin, it is criticized by many authorities. The principal disadvantage is that the sowing of winter wheat after corn (and winter wheat with few exceptions is characteristic in the Danube basin) meets with certain difficulties. The harvesting of corn is comparatively late, and may cause the sowing of wheat to be done too late. This is especially true for the northern part of the Danube region in Hungary.

In Bulgaria and on the Danubian plain of Roumania and Jugo-Slavia, this difficulty is not so great, because earlier varieties of corn may be harvested there as early as the beginning of September, and the medium varieties in the second half of September. Only late varieties are harvested in October and thereafter. Thus, after early and medium kinds of corn are gathered, wheat may be sown in October; and this is a favorable time for sowing on account of the second annual peak of rainfall which occurs in this month. The late varieties of corn, however, give better yields and are sown in preference. But if one takes into consideration that early kinds of corn are more reliable in dry years and in such a year give better yields than late varieties, and that the nutritive qualities of the grain of earlier varieties are better (higher in protein content),[2] then it may be more rational to produce earlier or medium varieties of corn than late varieties. If this were done, the corn-wheat rotation would not be so much criticized. It is much more severely criticized in Hungary where, in northern regions, corn is harvested later.[3]

The two-field rotation system may combine not only corn and wheat, but corn and other small grains. If corn is rotated with spring grains, there is not the disadvantage of late sowing that occurs with fall sowing of wheat after the corn harvest. The two-field system with oats or barley is common especially in the regions where the acreage under corn exceeds that under wheat.

One other objection to the two-field system is that only very rich soils such as those in the southern part of the Danubian plain (Voivodina) can support a continuous rotation of wheat and corn. But occasionally on rich soils in the Danube basin a still more irrational system is practiced, where one plant is cultivated continuously; thus in Serbia, on the land in valleys which are flooded each year, corn is planted continuously year after year.

The two-field rotation system, though it is the most usual, is not exclusively practiced. In the regions where fallow is common we meet the three-field system—in Bulgaria, especially in hilly regions; in southern Jugo-Slavia (Bosnia); and in the northeastern region of Hungary, especially on peasants' lands. However, the three-field rotation in the Danube basin generally includes corn on one of the fields, not small grain alone as in the traditional three-field system. For instance, a very common rotation in Old Serbia (side by side with the two-field system) is (1) corn; (2) wheat or other small grain; (3) fallow. Sometimes a four-field system is used: (1) corn; (2) wheat; (3) oats or rye; (4) fallow. The three-field system practiced in the northeastern region of Hungary is the traditional form, with fallow plowed for wheat. In southern Bulgaria we meet such rotations as fallow-wheat-oats or barley; or corn-wheat-oats.

As a more progressive rotation for Roumania to replace the two-field system a three-field system is suggested involving legumes or rape or forage, wheat, and corn.[4] However, the low percentage of area

[1] Dr. G. Jonescu-Sisesti, *Rumäniens bäuerliche Landwirthschaft* (Bucharest, 1912).

[2] T. Enescu, *Maïs roumaine* (Bucharest, 1922).

[3] Professor K. von Kerpely is much opposed to such rotation in Hungary as he explained in a personal interview.

[4] Opinion of Mr. J. Mandru, General Director of the Union of Agricultural Chambers of Roumania.

sown to legumes, forage crops, and rape in Roumania shows that at present such a system is not much followed. The three-year rotation system (without fallow) is practiced in Roumania also in the following forms: (1) winter small grain, (2) spring small grain, and (3) corn; or (1) spring small grain, (2) winter small grain, and (3) corn. Such a rotation is regarded as more progressive than the two-field rotation.[1] In the Transylvanian regions of Roumania more rational rotations are used. There is a tendency to introduce an improved three-year rotation (without fallow) or more intensive forms of rotation. More intensive forms of agriculture in Transylvania are connected with more intensive forms of animal breeding.

For Bulgaria, the opinion of authorities[2] is that the two-field system, like the traditional three-field system, must disappear soon. The rotation system is in process of reconstruction. Fallow is more and more sown to vetch, sunflowers, or tubers. Especially rapid is the development at present of the cultivation of sunflowers. However, there is as yet no established new progressive rotation in Bulgaria.

In Hungary, especially in its western trans-Danubian part, the rotation system is more intensive and rational. Large estates use rotation with a larger percentage of tubers and forage crops. More progressive and rational rotations are developed also in Croatia and in Slovenia (northwestern Jugo-Slavia) with a considerable percentage of forage crops (vetch, clover) and tubers. Wheat often follows after vetch with oats or clover. These two regions have the most progressive crop systems in the Danube region, and in connection with them the most highly developed livestock industry. Here the livestock consume the products of crops and, on the other hand, return the manure to improve the soil. Here we find better tillage, better agricultural machinery, and better farm management. This part of the Danube basin is nearest to the agricultural methods of western Europe.

[1] N. Cornatzeanu, "L'organisation des exploitations agricoles en Roumanie," *La Roumanie agricole* (Bucharest, 1929), p. 397.

[2] Professor J. Mollow of the University of Sofia.

Fertilizers

Manure and commercial fertilizers are used comparatively little in the Danube basin. This is true especially of Bulgaria, Roumania, and southern Jugo-Slavia; it serves further to illustrate the extensive methods of farming in the Danube basin. Rich black soils predominate in the larger part of the basin, especially on the plain, and contain sufficient quantities of humus and mineral nutritive elements. Hence it is possible to practice for a long time an extensive rapacious utilization of land without exhausting it. Furthermore, a rather dry climate is not favorable to large use of manure or commercial fertilizers, because with low humidity, fertilizer cannot give as good results as in a humid climate. A further reason why manure is applied only in limited quantity in the Danube basin is that livestock are kept on pasture throughout the major part of the year, and the quantity of manure available for use on plow land is small.

Jonescu-Sisesti says that Roumanian peasants generally do not fertilize their land. The large estates in Roumania kept even less livestock than the peasants and had not enough manure for good fertilization. Commercial fertilizers are practically never used in Roumania, though since the beginning of the present century some authorities indicate that certain regions of Roumania lack phosphate, and that its use would be desirable.

The situation is the same in Bulgaria and in southern Jugo-Slavia (Serbia and Bosnia). Here manure is used in small quantities and rarely; and even if used thus, in so irrational a manner as to give little result. Manure is kept dry for a long time on the yards; and after being hauled to the fields during the fall it remains unplowed until spring, so that the major part of its nutritive elements is lost. Commercial fertilizers are less known here even than in Roumania.

A more or less normal use of fertilizer takes place only in Hungary and in the northern region of Jugo-Slavia on former Hungarian territory, but even here the use of fertilizer is considerably less than in western European countries such as Germany. Probably the drier climate is partially responsible for this.

The following figures (1926–27 data) show the percentages[1] of plow land fertilized in different regions of Hungary:

Region	Manure	Commercial fertilizer	Total
Trans-Danubian (western) region	26.4	10.5	36.9
Danubian plain	19.1	5.2	24.3
Northern hilly region	23.2	5.5	28.5
Total Hungary	22.4	7.2	29.6

According to this inquiry manure is applied once every four or five years. But certain authorities[2] find that this is too optimistic, and say that manure is applied as often as once in five years only on the better managed large and middle-sized estates; peasants generally apply manure not more than once in 7 to 9 years. The figures above show that on the Danubian plain, the principal wheat-producing region, fertilizer is used less than in other localities of Hungary, and most in western Hungary where more diversified farming is practiced. Manure is usually applied to corn. Of the commercial fertilizers the most used is acid of phosphate; ammonia and potash are applied only rarely in Hungary. Commercial fertilizers are used principally on larger estates; the peasants use animal manure almost exclusively.

The dry climate limits the use of fertilizers because fertilizer can increase yields considerably only in the presence of sufficient humidity, and large quantities of fertilizers applied in dry regions, especially ammonia or manure, may sometimes give poor rather than good results. Ammonia influences the growth of stalks and leaves. Greater growth of stalks and leaves of some plants, for instance of wheat, takes more moisture from the soil and lengthens the period of growth; and when the time of ripening arrives later, it may be that in a dry climate there is not enough moisture to ripen the grain properly. As a result the wheat crop would yield much straw but only a little grain. Furthermore, sometimes an excess of manure may tend to promote lodging.[3] The use of phosphate, on the other hand, rather shortens the period of growing and ripening of wheat;[4] hence phosphate is especially useful in countries with dry climates.

In general, the Hungarian experience shows that fertilizers not only increase the yield of wheat but also improve its quality. The percentage of protein is higher and the weight of 1,000 kernels is heavier for wheat grown on fertilized land than on land not fertilized.[5] But since the influence of fertilizer in the dry Hungarian climate is more limited than in the more humid climate of western Europe, it cannot be expected that an increase of the use of fertilizer in the Danube basin will increase the yield of wheat or of other grains to the level of the yields in the more humid countries of western Europe.

On the whole, it is unreasonable to expect that with a more rational and intensive system of rotation, and with better fertilization of the land, the yield of grain in the Danube basin may be increased up to the western European level. Certainly it may be increased somewhat, but only to a comparatively lower level.

Machinery

In accord with differences in the level of culture of the population in different regions of the Danube basin, agricultural machinery and implements are in all states of development, from the primitive wooden plow to the modern tractor. In southern Serbia, Montenegro, and southern Bosnia we find very large plows made entirely of wood without a single piece of iron, dragged by from 4 to 8 pairs of oxen. Wooden plows, called *ralice* in Serbia or *oralo* in Bulgaria, are found also in other parts of Jugo-Slavia south of the Danube and Sava, as well as in Bulgaria. The farther one goes to the north, the smaller the proportion of wooden plows. In these southern regions not more than 10 per cent of the plows are modern iron ones. But in northern Serbia or northern Bosnia, in the val-

[1] I. Sajohelyi, "Fumage des terres labourables de Hongrie," *Revue hongroise de statistique*, VI, No. 3, 1928.

[2] Professor K. von Kerpely, in a personal interview.

[3] Agr. Tibor Pollatsek, *Der ungarische Weizenbau mit besonderer Rücksicht auf das trockene Klima* (Budapest, 1927), pp. 20–28.

[4] Professor Pfeiffer, *Landwirtschaftliche Versuchsstationen*, LXXXII, pp. 290, 298.

[5] Kosuthany, *Der ungarische Weizen und das ungarische Mehl* (Budapest, 1907), pp. 170–71.

leys of the rivers flowing into the Danube, many peasants have iron plows and only from 10 to 30 per cent have the primitive wooden ones. In Bulgaria also the iron plows are found most commonly on the Danubian level land, especially in the western part of the Danubian level around Vidin and Lom.

North of the Danube and Sava in Jugo-Slavia, in the former Hungarian districts, the wooden plows are seldom seen. There are only a few wooden plows in Roumania; here we find the modern iron plow of the Sack type (Sack is the proprietor of a leading German factory) as the common implement on large and on small peasant farms alike.

Along with primitive implements for land tillage, we find in the same regions very primitive implements for crop harvesting and for threshing. The sickle and, less often, the scythe are the only implements for crop harvesting in the southern regions. Even in the north the sickle and scythe predominate on the peasant farms. The small size of the peasant holdings, and the common occurrence of scattered parcels in a single holding, do not permit the use of harvesting machinery. Hence harvesting machines are relatively numerous only in the regions where large and medium-sized farms predominate. For instance, of 9,813 reapers in Jugo-Slavia, 7,000 were in the region of the Danubian plain (Voivodina and Slavonia), where in 1925 there was one harvester on each 600–700 acres of plow land, while in all Jugo-Slavia there was only one harvester for each 1,500 acres or more of plow land. About the same figures held for Bulgaria, where there was one harvester on 1,200–1,300 acres of plow land, or on about 75 farms. In Roumania also harvesters were common only on large estates and peasants harvested their crops with sickles.

The same contrasts exist in the threshing methods, implements, and machinery. Throughout Bosnia and southern Serbia, in many regions of Bulgaria, and in certain parts of Roumania (especially Dobrogea), threshing is done with horses or oxen. The animals tread out the grain, which is spread on the ground; or they drag behind them a heavy wooden roller or a kind of wooden sledge filled with stones. Grain threshed in such a manner is cleaned by tossing it in the wind with a shovel.

On the other hand, in the same regions, especially in Roumania and Bulgaria, you may see practically through all the country modern steam threshing machines—sometimes two or three in the same locality. These thresh wheat and other grain not only for larger estates, but also for peasants. Usually the steam threshers are owned by the larger landowners or by special threshers who thresh the peasants' crops for a stated percentage of the grain.

Generally speaking, the use of modern agricultural machinery is increasing in the Danube basin. In 1870 half of the plows used in Hungary were of the ordinary wooden type.[1] Gradually they were superseded by the "Sack" plow; and now the steam plow and tractor are more and more in favor on large estates. Bulgaria is about in the same situation now as Hungary was fifty years ago. In 1893 there were only about 18.7 thousand iron plows and about 400 thousand wooden plows in Bulgaria. In 1910 there were more than 114 thousand iron plows; in 1921 there were 181 thousand, and in 1925 there were 256 thousand. Meanwhile the total number of wooden plows remained about 400 to 450 thousand. In Serbia, in 1897, there were 96 wooden plows to each 100 iron plows, but by 1925 (in Old Serbia) the ratio was only 41 to 100.[2] In northern Jugo-Slavia and in Hungary, as was stated above, there are now no primitive wooden plows.

Official statistics of agricultural implements and machinery show that the process of modernizing agricultural machinery continued after the war. In Hungary tractors are used more and more; there were 1,183 tractors in new Hungary in 1925, and 549 locomotive steam windlass plows. For 1927, some authorities estimated the number of tractors at 3,400.[3] In 1925, three-fourths of the tractors were upon middle-sized and large estates, and only one-fourth on farms of less than 140 acres. In 1914 only 2 per cent of the land was plowed with tractors

[1] T. Jekelfalussy, *The Millennium of Hungary* (Budapest, 1897), p. 453.

[2] B. Miloshevitsh, "Agricultural Implements and Machinery in Jugoslavia," *Glasnik*, March 1927, V, No. 17. (In Serbian.)

[3] Professor von Kerpely's statement.

and steam plows; in 1925 about 8.3 per cent. On large estates in Hungary, larger than 1,400 acres, about a third of the land was plowed with tractors in 1925. Even in typical peasant country, as in Bulgaria, where there were no large estates at all, some tractors are now used. In 1921 there were only 30 tractors in Bulgaria; but in 1926 there were 473 according to official statistics.

Modern steam or motor threshing machinery has also tended rapidly to replace primitive methods of threshing in the whole Danube basin.[1] Occasionally steam threshers are bought by co-operative associations, but more often by private undertakers.

Perhaps it will prove difficult to introduce modern harvesting machinery on small peasant holdings, because of their small size. On large and medium farms binders are now common in all of the principal wheat-producing regions. It is true that sometimes they are not used, in order that the work may be given to the numerous small peasants and agricultural laborers. This was true in recent years in Hungary.[2] There is no sign of a rapid increase in the numbers of binders in the Danube basin since the war; there are comparatively few on peasants' holdings, and likewise few drills or cultivators. Seeding is commonly done on peasants' lands by hand. In Bulgaria there is only one drill for 500 farms. In Jugo-Slavia there is one drill for 35 farms, but most of them are in northern Jugo-Slavia in former Hungarian regions. In Bosnia and southern Serbia the situation is about as in Bulgaria.

Very few cultivators are used on peasant lands. Peasants cultivate their corn by hand in Bulgaria, Roumania, and southern Jugo-Slavia. On the Danubian plain in Jugo-Slavia and in Hungary cultivators are more common. However, cross cultivation (in two directions) is not at all common there. It is interesting to observe that in Roumania before the war simple agricultural machinery such as plows, harrows, and even drills on the large estates made up a smaller percentage of the total machinery in the country than did the percentage of land cultivated in these large farms of the total area cultivated. This shows that large estates were worked partially with peasant implements. Consequently agrarian reform in Roumania, which transferred much land from large estates to peasant holdings, did not radically change the system of working the land.

Oxen are used more than horses as draft animals in agriculture in the Danube basin. In Bulgaria there are considerably more oxen than working horses; in 1925, 936 thousand oxen as against 215 thousand horses were used for farm work. In Roumania the number of oxen is about equal to the number of horses except in Bessarabia, where horses are more common. In Jugo-Slavia also the number of oxen exceeds the number of horses; and in Hungary oxen are as numerous as horses. The type of cattle in the Danube basin is better fitted for hauling than for beef or dairy purposes. The gray Hungarian type is regarded as one of the best for work.

Agricultural Labor

The problem of agricultural labor presents itself differently in the several Danube countries, and is dependent upon the system of distribution of landed properties. It is quite different in the countries without large estates, such as Bulgaria or Serbia, from what it is in the countries with large rural properties, such as Hungary.

Hungary has relatively the largest number of agricultural laborers, and may be regarded as a typical country of agricultural laborers. Agricultural production on the large estates in Hungary is organized with hired labor as the basis. Within the limits of post-war Hungary there were in 1910 about 770 thousand agricultural laborers;[3] in 1920 there were 991 thousand. Agricultural laborers outnumbered patrons (landlords and independent peasants) two to one—an illustration of the degree to which Hungarian agriculture depended on hired laborers. The proportion of agricultural laborers in Hungary of the whole population engaged in agriculture is higher than in many such countries as Germany, Denmark, and even Italy.

The purpose of the recent agrarian re-

[1] In Bulgaria, the number of threshing machines increased 50 per cent during the period 1921–25; in Jugo-Slavia, 30 per cent.

[2] Professor von Kerpely's statement.

[3] League of Nations, *Agricultural Problems* (Geneva, 1926), pp. 446–47.

form in Hungary was to assure agricultural laborers of their own land. It was expected that something like three-fourths of the agricultural laborers would become landowners; but the land which each laborer actually received was so small in amount that those who received the land did not become independent farmers, but remained agricultural laborers. Thus Hungary continues to be sufficiently, perhaps excessively, supplied with agricultural laborers. The manner of payment of laborers has not become definitely fixed since the war. Before the war some laborers were paid mostly in money, others mostly in kind. The latter received nothing more than a house and plot of land.

In those regions which since the war have been separated from Hungary and added to Roumania and Jugo-Slavia, the relative percentage of agricultural laborers to the total active agricultural population is not so high as in Hungary proper. However, in the territory which passed to Jugo-Slavia (Voivodina and Croatia-Slavonia) these percentages were as high as about 40, and in Transylvania 33. Thus two-fifths in the former region and one-third in the latter of all the population actively occupied in agriculture (including helpers who are members of families) were agricultural laborers or agricultural servants.[1] In 1910 in corresponding regions there were in absolute numbers in Transylvania about half a million laborers, in northern Jugo-Slavia about 150 thousand. Here also, many obtained their own land after the agrarian reform, and it is difficult to say how many laborers there are now, because there has been no census of occupations since the reform took place.

It is interesting to observe that in pre-war Roumania, in spite of the very high percentage of large landed properties, there were comparatively few agricultural laborers. Roumanian landowners, as we have seen, rented the larger part of their estates to small croppers. The remaining part of their land they worked less with true agricultural laborers than with the help of the croppers who worked in partial payment of their rented plots. For this reason official statistics of occupation in Roumania in 1913[2] show only 204 thousand agricultural laborers as against more than a million independent agriculturists; that is, there was only one agricultural laborer on five agricultural enterprises. Since the war the situation can have changed only in the direction of a deceased number of agricultural laborers, because these obtained their own land. The fact that landlords in Roumania who lost the largest part of their lands in the agrarian reform continue to rent their land to croppers shows that there are not many agricultural laborers. In 1922 in Roumania nearly 3 million acres were share-rented and about half of that area was money-rented, the major part by larger landowners.[3] In Roumania there is no special class of agricultural laborers as in Hungary. During the summer harvesting season peasants from the mountainous regions come down to work on the plain. Before the war many came also from neighboring parts of Bulgaria and Serbia as seasonal agricultural workers, returning to their homes in the fall. Women as well as men undertook this work.

In the regions of small peasant properties such as Bulgaria and Old Serbia, the problem of agricultural laborers is not very pressing. Farms are worked mostly by members of the owners' families. Before the war in Bulgaria there were a little more than a hundred thousand agricultural laborers (census of 1905); that is, one laborer on five farms. Since the war the number has increased. According to the census of 1920, there were 223 thousand agricultural laborers, or two for five farms. In Bulgaria, as in Roumania, the peasants from the mountains in the Balkan ridge descend for summer work on the plains in northern and southern Bulgaria. At most the problem of agricultural laborers cannot be acute in a country where the land is farmed mostly by peasants. Most agricultural laborers are members of peasant families which do not have enough land of their own to keep all of the workers occupied.[4]

[1] Buday, *Dismembered Hungary*, pp. 89–93.

[2] *Statistique des professions de la Roumanie* (Bucharest, 1923).

[3] G. Jonescu-Sisesti, *Structure agraire et production agricole de la Roumanie* (Bucharest, 1924), pp. 24–28.

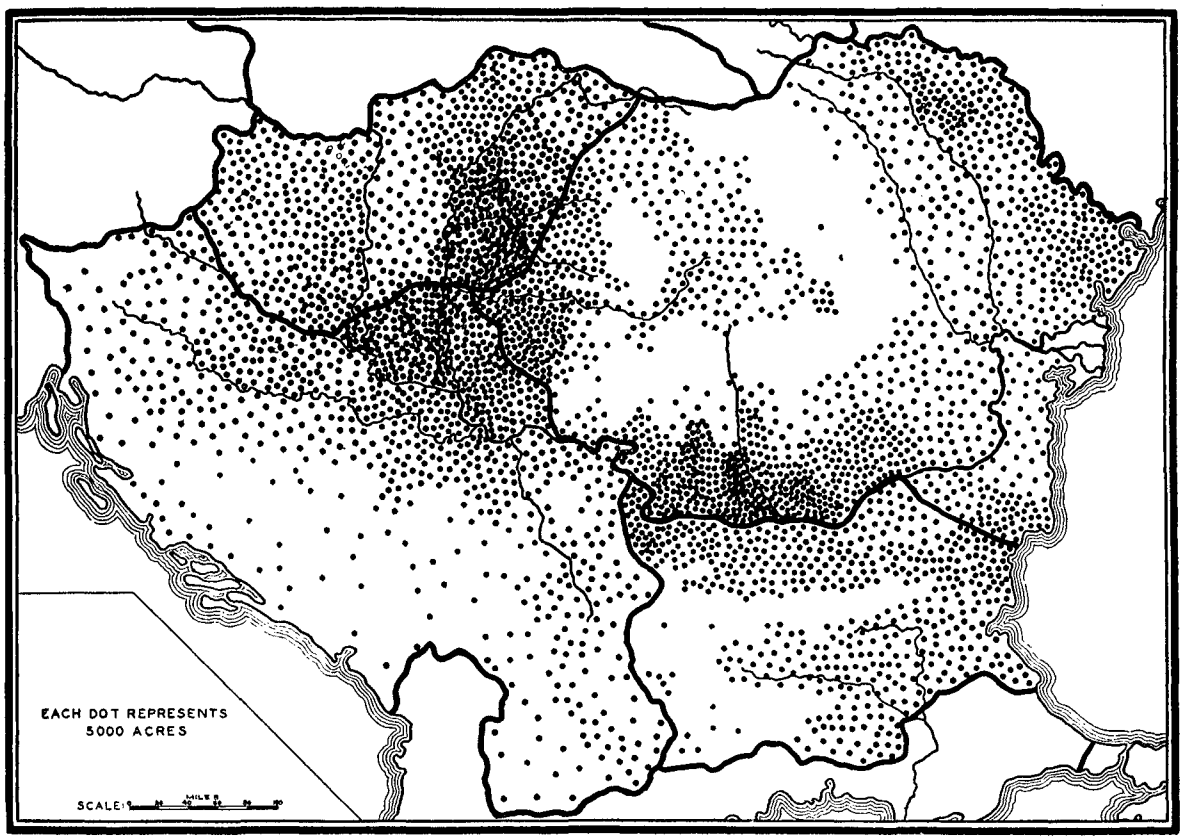
[4] J. Mollow, *Agricultural Laborers in Bulgaria* (Sofia, 1923. In Bulgarian).

IV. THE CULTIVATION OF WHEAT

The Wheat Regions

The wheat area in the Danube basin, as we have seen, occupies a little more than a third of the total cereal area and is about equal to the area in corn. These two crops together occupy more than 70 per cent of the total cereal area and nearly 60 per cent of the entire area of arable land. Before the war, the wheat area was a little larger than the corn area; after the war, corn took first place, though in Hungary and Bulgaria wheat remains dominant.

In an earlier section[1] we stated that wherever climate and soil conditions were favorable, wheat and corn were foremost in the competition for land. They divide the land between them in about equal parts, though in some regions wheat finds more favorable conditions and occupies a larger area than corn. Generally speaking, the most favorable conditions for the production of wheat are on the Danubian plains. The accompanying map shows in greater detail the distribution of wheat area (1925–27 data) throughout the four Danube countries.[2]



Map 2

In Old Roumania, more than half of the total wheat area is in the six districts bordering the Danube. In this region wheat occupies first place among all the crops, while in other sections corn ranks first. Wheat is grown extensively also on the level lands west of Transylvania and in certain localities of Bessarabia.

In Hungary, the principal wheat area is on the Danubian plain. Here, if the sandy region between the Danube and the Tisza is excluded, wheat occupies more than a third of the entire arable area and about 45 per

[1] See above, pp. 216 ff.

[2] The map is based upon data shown in Appendix Table II.

cent of the total cereal area, while in trans-Danubian Hungary wheat occupies less than a fourth of the arable land (24.6 per cent in 1925–27) and about a third of the total cereal area (35.2 per cent).

On the Danubian plain in northern Jugo-Slavia, wheat occupies more than a third of the arable land, sometimes more than 40 per cent. Former Banat and Backa (now Voivodina), the eastern plain in Croatia and Slavonia (Srem and Osijek districts), and the northern districts of Serbia following the Danube and the valleys of the tributaries of the Danube (Drava, Morava, Timok) are the principal wheat-producing areas of Jugo-Slavia.

In Bulgaria the principal wheat-producing region is the Danubian level and tableland north of the Balkan mountains, especially the districts nearest to the Danube.

These are the chief wheat-producing regions, and are those which give the largest surplus. In other parts of the Danube basin wheat also has a very important place, but it does not preponderate as in the sections delineated above.

Preparation of the Soil

In the Danube basin the wheat is mainly winter wheat. Spring wheat, with few exceptions, is sown only as an emergency crop when winter wheat for some reason has failed or could not be sown in the fall. In Hungary, spring wheat occupies only 1–2 per cent of the total wheat area; in Jugo-Slavia, 3–4 per cent; in Bulgaria about 2 per cent. Only in Roumania is the area of spring wheat somewhat larger, more than 9 per cent of the total wheat area; here are some sections where spring wheat is sown regularly, in certain regions of Bessarabia and Dobrogea. These regions are adjacent to the Ukrainian wheat-producing regions on the steppe of the Black Sea. On this steppe the percentage sown to spring wheat increases as one moves eastward. One of the reasons may be the more rigorous winter and more continental climate of the eastern regions. The Danube basin, with its milder climate, is a natural region of winter wheat.

Rye ranks as second in importance as a winter crop in the Danube basin, but it is of marked significance only in a few regions not favorable for wheat, such as the sandy soil on the Danubian plain, or other sections mentioned above.[1]

There are different methods of preparing the soil for wheat, depending partially on what crop precedes wheat—whether wheat is sown on fallow, or follows an early-harvested crop such as legumes or a late-harvested crop such as corn.

The fallow affords the greatest freedom for good preparation of the soil. However, we have seen that fallow is decreasing in the Danube basin, and in the regions of more progressive methods has practically disappeared. It remains in a larger degree only in the localities having more traditional forms of agriculture—in the south of the basin and on peasant lands in north-eastern Hungary. Since fallow is more common in the regions with less advanced agriculture, it follows that preparation of soil for wheat on fallow is not always the best. Fallow land is commonly not plowed in the previous fall or early in the spring, but only when spring work is finished, about in June. Before this time it is used as pasture. Such a system is applied in both Bulgaria and Hungary. It would be better practice to plow the land very soon after harvesting the previous crop, before it became too hard, and then to give a second deep plowing some time later during the fall.[2] Such breaking of the fallow would be especially advisable in the Danube basin, where the dry climate makes the conservation of late rainfall especially desirable.

When wheat is sown after fallow, the land in the Danube basin is generally plowed two or three times, in Hungary at least three times or even more. There was a tendency in Hungary among authorities to recommend many plowings, not less than five, but other authorities now do not see any necessity for plowing more than four times. Sometimes too much plowing is rather injurious. Such is the point of view of Pollatsek, who holds that the time of plowing, especially that it be done in the fall, is more important than the number of plowings. Plowing is not deep, especially on the peasant lands. In Hungary, east of

[1] See above, p. 217.

[2] T. Pollatsek, *Der ungarische Weizenbau mit besonderer Rücksicht auf das trockene Klima* (Budapest, 1927), p. 30.

the Tisza, in the tracts of the most extensive agriculture, peasant lands are plowed about 3 or 4 inches deep, and between the Tisza and Danube, 4 inches. West of the Danube the farming is more intensive and plowing for wheat is deeper, sometimes as much as 8 inches.[1] Plowing on the large estates in Hungary also is deeper. However, Pollatsek warns against too deep plowing in the Danube basin. In his opinion it should not be deeper than necessary to keep all the moisture, and as precipitation on the Danubian plain is moderate, plowing need not be very deep.[2] Wheat plowing in Roumania also is about 3½ or 4 inches deep on peasant lands, and since most of the land belonging to landlords also is worked with peasant plows, deep plowing is not practiced here. Primitive wooden plows in Bulgaria and southern Jugo-Slavia preclude deep plowing in these regions. Here the number of plowings for wheat after fallow is also two or three times.[3]

If wheat follows an early-harvested crop, there is still time enough for good working of the soil. In Hungary, on better organized farms or large estates, wheat often follows a forage crop such as vetch sown with oats, or clover.

It is the prevalent opinion in Hungary that soil, after early crops, must be plowed three times—first, early breaking of the harvested field soon after harvest; then, four to six weeks later, deep plowing; and finally, four to six weeks later, another moderately deep plowing for seeding. Yet on several well-managed estates it has been found that there is no necessity for so many plowings for wheat after an early crop. These prefer to use a disk-plow (Tellerregge), which penetrates the soil four to six inches, for breaking land after harvest; and they replace the last plowing for seeding by disking. Many in Hungary regard disking as better on account of the dry climate.[4] In Roumania, after the earlier crops, the soil for wheat is plowed twice—once in July, and again in September before seeding begins.[5]

[1] Professor von Kerpley's statement.

[2] *Op. cit.*, pp. 30, 35–37.

[3] J. Mollow's opinion for Bulgaria.

[4] Pollatsek, *op. cit.*, pp. 31–35.

[5] T. Mandru, Director-General of the Union of the Chambers of Agriculture, in a personal interview.

After corn and sugar beets, which are harvested late, it is impossible thoroughly to work the land. Many hold that it is even unnecessary because the soil is left in good condition. In Hungary sometimes the land has been plowed for corn and beets as deep as 12 inches. Even on peasant lands the plowing for corn is fairly deep, in Roumania about 6 inches. Hence the soil for wheat after corn is usually plowed only once, rarely twice. Sometimes, if the corn is late, there is no time at all for plowing. Wheat is then sown before the corn is harvested, and is tilled later to cover the seeds. Generally wheat is sown immediately after the corn harvest, the soil having been plowed and harrowed previously. On the Danubian plains in northern Jugo-Slavia (Banat and Backa), where wheat normally follows corn, the better farms have time for two plowings, occasionally three. But in Roumania and in Bulgaria, as a rule, there is only one plowing for wheat after corn.

Sowing of Wheat

Wheat in the Danube basin is not always sown with a drill. In Hungary and the formerly Hungarian regions of northern Jugo-Slavia, wheat is commonly sown by row drills except on some peasant land; but in southern Jugo-Slavia, in Bulgaria, and on the peasant lands in Roumania, sowing is always by hand. There are only a few drills in these regions; the southern part of the Danube basin in general and peasant lands in many of the northern regions do not possess the advantage of drills for use in sowing.

The most favorable time for sowing in the Danube basin is the second half of September and the beginning of October; earlier sowing is not favorable because August and September are very dry months, whereas in October the rainfall is usually greater. Hence farmers try to sow during this period if they possibly can. But, as we have seen, wheat often follows corn, and if the corn is a late variety, the sowing of wheat is retarded until late in November, practically until winter.

Such late sowing is disadvantageous because it causes smaller yields of wheat. If wheat has no time to start and get set before the winter, it cannot utilize the moisture of the fall and winter and is more

likely to suffer from drought and hot weather in the next summer.

In the regions where wheat is raised on fallow or follows earlier crops than corn, as in Hungary, sowing is usually done before the middle of October. Sometimes it is sown later when farmers wait for rain; but it is proved that the earlier September sowings in Hungary give better yields.

On the Danubian plain in Hungary farmers recently have followed the practice of later sowing because it was thought that this controlled the appearance of the Hessian fly in the following year. Nevertheless many oppose this practice on the ground that it is not yet proved that late sowing in fact has this advantage and, even if it does, late sowing is costly because it results in poorer yield. Since late sowing of wheat after corn is unavoidable, many oppose the corn-wheat rotation, or favor an earlier variety of corn.

As a general practice, peasants in the Danube basin use home-grown wheat as seed, and rarely buy the better or specially bred seed. They do not always use even well-cleaned wheat for seed. On the larger farms more attention is paid to the selection and preparation of seeds, though Jonescu-Sisesti says that before the war neither small peasants nor large landlords paid sufficient attention to the selection of seed. He recognized, however, that on large farms the seed was better cleaned, as was quite natural because peasants have no machinery for cleaning grain. Other authorities insist that as early as the beginning of the twentieth century in Roumania, there was not one landlord who did not treat his wheat seed with sulphate.

In the northern regions of Jugo-Slavia (Croatia and Slavonia, Slovenia, Banat and Backa), the co-operative organizations of farmers help much in procuring better seed. These are not co-operative seed-breeding organizations, but societies which buy superior seed for their members and more often organize cleaning stations equipped with the necessary machinery for cleaning grain. Later we shall say more concerning special measures for wheat breeding which have begun to develop in some countries of the Danube basin, and of governmental activities in this direction.

The quantity of seed used per unit of area differs. The average quantity of seed per acre is given in Bulgarian agricultural statistics as 201 pounds (3.3 bushels) per acre in 1921–25, with a range from 165 pounds (2.8 bushels) in one of the southern districts to 245 pounds (4.1 bushels) in one of the Danubian districts. This is a large quantity of seed, but in Bulgaria sowing is by hand. Considerably less seed is required when drills are used.

For Jugo-Slavia, the quantity of wheat seed per acre is estimated at 143 pounds (2.4 bushels) with fluctuations from 131 to 154 pounds (2.2 to 2.6 bushels) according to region.

In Roumania, it is estimated that sowing by drill requires 125–161 pounds (2.1–2.7 bushels) per acre; by hand, 143–196 pounds (2.4–3.3 bushels). In Bessarabia, however, less seed is used.[1]

In Hungary the old rule was 100 liters of wheat seed per arpent cadastral, that is, about 121 pounds (2.0 bushels) per acre. The estimate of the Hungarian Statistical Office of the quantity of seed used in the post-war years is about 156 pounds (2.6 bushels) per acre.[2] The experience of Gyarfas on the small Danubian plain shows that the best results will be obtained with about this quantity. On some of the best estates as much as 201 pounds (3.3 bushels) per acre is used. Pollatsek thinks that, in spite of the rule that less moisture calls for fewer plants on the same area, thin sowing is not to be advised for Hungary.[3]

Harvesting and Threshing

From seeding to harvest the wheat crop receives practically no care from the farmers in the Danube basin. They do not struggle to combat diseases or the different parasites. Better farmers in the more advanced regions apply special treatment to seed before sowing, as in Hungary, northern Jugo-Slavia, and on the larger estates in Roumania. A wheat crop rarely is harrowed in the spring. Peasants sometimes put livestock on wheat in the fall, when the plants are well advanced, but this

[1] See article by Dr. A. Munteanu, in *La Roumanie agricole* (Bucharest, 1929), p. 77.

[2] Konkaly Thege, "Production and Commerce in Food Grain," *Revue hongroise de statistique*, April 1926, Year IV, No. 4, p. 196.

[3] *Op. cit.*, pp. 43–44.

practice is not general. Larger estates do not follow it and in general it seems not to be regarded as a desirable practice. Weeding of wheat fields is also uncommon.

The ripening of winter wheat occurs at the end of June or early in July. The methods of harvesting vary greatly according to the level of agricultural technique in the region and the size of farms. Harvesting with binders is common in the more advanced regions such as Hungary and northern Jugo-Slavia, and on large estates in Roumania. In less advanced regions and on small peasant farms throughout the Danube basin the sickle and sometimes the scythe are the common implements. The situation has not changed since the war; indeed, harvesting with sickles on peasant farms is even more common in several regions because the area of small holdings has increased since the agrarian reforms.

After being bound into sheaves and put into shocks of cross form, the wheat remains in the fields to dry before threshing. Threshing of wheat in most regions is done with steam or motor threshing machinery. Even in the regions where harvesting is by sickles, threshing is done by machinery more often than not. Landlords thresh sometimes not only their own wheat, but also the peasants'. Sometimes special enterprisers own threshing machinery and thresh wheat for the peasants, receiving payment in money or in percentage of the grain, usually 5 to 8 per cent. Sometimes, but not often, threshing machinery is bought by peasant associations.

Certainly steam threshing is common in the Danube basin. In the second half of July or in August one may see steam threshing machinery on the border of each village amongst the stacks of wheat, busy with threshing the peasants' wheat. Such a picture is typical not only of Roumania, but also of Bulgaria, where there are no large estates.

But in the less advanced regions of the Danube basin, primitive methods of threshing wheat with horses or oxen are also used. In Dobrogea, Bulgaria, and southern Jugo-Slavia, smaller farmers use this primitive method extensively. Grain obtained after such a threshing, and cleaned only by the wind, is never very clean. Hence wheat grown by the smaller peasants is generally less clean than grain from larger estates; and wheat from the less advanced regions contains more foreign stuff than Hungarian grain. Complaints may be heard in Roumania that since the agrarian reform, which increased the percentage of peasant wheat, the wheat has not been so well cleaned.

Threshing of wheat takes place soon after harvesting. Dry August and September weather is very favorable for this. In general the grain crops in the Danube basin are moved to market early in order to take advantage of water navigation on the Danube, which often closes in December, and also to take advantage of better conditions in the roadways. Threshing is usually from stacks located near the villages, where wheat is brought from the fields. Peasants often put these stacks close to each other in order to concentrate threshing activities. Storage of grain on peasant farms does not meet many difficulties on account of the small size of peasant farms and limited production on each. Larger estates are supplied with the requisite barn space.

Wheat Yield per Acre and Factors Determining It

Climatic conditions of the Danube basin, especially the comparatively moderate amount of precipitation, do not permit very high yields of wheat. Even in the sections that apply advanced agricultural methods the yields of wheat are lower than those in the western European countries with a more humid climate. Danubian winter wheat is a type of hard winter wheat, and it is unreasonable to expect that its yield should be as high as that of soft wheat even if the agricultural methods employed were equally intensive. Moisture is always scanty, and heavy use of fertilizers cannot give such results as in humid countries. Yields of wheat in all Danube countries before the war were below those in Germany and Belgium, and even France. Since the war this situation continues. However, the yields of wheat in the Danube basin before the war were higher than in Italy and Spain, to say nothing of Russia, where climatic conditions were still less favorable and agricultural technique not better than in the least advanced of the Danube countries. Table 9 (p. 230) shows comparative

yields of wheat (including both winter and spring wheat) for different countries.

Before the war the yield of wheat in Germany was about twice that of the average for the Danube basin; in Belgium it was still larger. Both these countries have humid climates; they produced soft wheat and their agriculture was on a high level of intensity.

TABLE 9.—WHEAT YIELD PER ACRE IN SELECTED COUNTRIES, PRE-WAR AND POST-WAR*

(Bushels per acre)

Country	1909–13	1923–27
Hungary	19.3	19.0
Jugo-Slavia	15.6	15.4
Bulgaria	15.7	13.7
Roumania	16.7[a]	12.6
Four countries	16.8	14.7
Germany	32.6	28.8
Belgium	37.6	38.9
France	19.7	20.8
Italy	15.6	17.9
Spain	13.7	13.8
Russia	10.2	10.9
United States	14.7	14.5

* Calculated from official data, largely through the U.S. Department of Agriculture.

[a] Four-year average.

In France, the largest wheat producer in western Europe, yield was not so high as in Germany and Belgium. Before the war it was about the same as in Hungary, which had the highest yield among the Danube countries. The other Danube countries had, before the war, about the same yield of wheat as Italy and considerably higher yields than those of Spain and Russia, and also of the United States.

Since the war yields in the Danube countries have been smaller than before the war, as in certain other belligerent countries such as Germany. On the average, the yield of wheat in the Danube basin over the period 1923–27 was lower than in Italy, and on about the same level as in the United States. Yield was small particularly in Roumania, while the situation in the three other Danubian countries was better. The yields in Hungary, Bulgaria, and Jugo-Slavia were about on the pre-war level.

The reason for so unfavorable a situation in Roumania may be found in the radical agrarian reform. It is necessary to recall that more than half the total wheat area in pre-war Roumania was in large estates. Agrarian reform interfered greatly with wheat production in Roumania. From large estates, land passed to small farms; and, though peasants decreased the area under wheat on their farms, the yield of wheat on small farms has always been lower than on large estates. Before the war, yield per acre in Roumania during the six years 1904–09 was 16.4 bushels per acre on large estates, but only 13.9 bushels per acre on peasants' land.[1]

The post-war average yield of wheat in Roumania, 12.6 bushels in 1923–27, was below the pre-war yield on peasants' lands. This may be explained by the faulty adjustment of the peasantry to the new conditions caused by the agrarian reform, and is in part a consequence of the war.[2] In other Danube countries, however, where agrarian reforms were considerably less radical (Hungary), or did not interfere with agricultural production among the majority of producers (Bulgaria and Jugo-Slavia), the wheat yield in 1923–27 had about recovered the pre-war level.

Chart 1 shows yields per acre in each of the four Danube countries from 1920 to 1929, in comparison with the pre-war (1909–13) average. In Hungary and Jugo-Slavia, the yield per acre has equaled or exceeded the pre-war average in five of the past ten years, and this occurred in two years in Bulgaria. But yield per acre in Roumania has not equaled the pre-war average even once in the past decade. The chart suggests that there has been an upward trend in yield per acre in the past decade in Hungary, Jugo-Slavia, and Bulgaria, though not in Roumania. Doubtless the apparent trend represents in part a general recovery of agriculture after the cessation of the war, though it also represents nothing more than the succession of

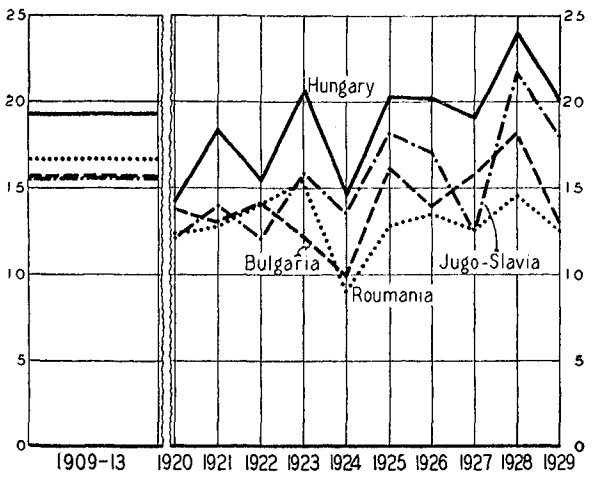
[1] Jonescu-Sisesti, *Rumäniens bäuerliche Landwirtschaft.* Hungarian official statistics show that in Hungary also the yield of wheat on small holdings is considerably lower than on large estates. An especially high yield of wheat is found on the estates larger than 1,400 acres. *Annuaire statistique hongroise,* 1926, p. 72.

[2] It is also possible to suppose that during the post-war years climatic conditions in Roumania were relatively less favorable than in the other Danube countries.

good and bad seasons. There happened to be more years unfavorable for wheat in the period 1920–24 than in the period 1925–29. The data do not seem to warrant the conclusion that at present there exists a fundamental tendency toward increase in yield per acre, of such a nature that it may be expected to persist for many years to come.[1] The distribution of good and bad years is such as to create difficulties in selecting any given post-war period as the appropriate one for comparisons of yield in pre-war and post-war times; but on the whole the period 1923–27, containing two medium, one poor, and two fairly good years, seems to be as appropriate as any for use in characterizing what may be called the post-war level of yield per acre or production of wheat.

CHART 1.—WHEAT YIELD PER ACRE IN FOUR COUNTRIES OF THE DANUBE BASIN, AVERAGE 1909–13 AND ANNUALLY FROM 1920*

(*Bushels per acre*)



* Based on data in Appendix Table III.

Climatic conditions in the Danube basin give rise not only to the comparatively moderate average yield of wheat per acre, but also to considerable instability. There are large fluctuations in the amount of rainfall from year to year, and long periods of summer drought in certain years, and these cause widely fluctuating yields, especially in Roumania. Table 10 shows yield per acre annually in four Danube countries for the pre-war period 1905–14.

TABLE 10.—YIELD OF WHEAT PER ACRE IN DANUBE COUNTRIES, 1905–14*

(*Bushels per acre*)

Year	Hungary	Roumania	Bulgaria	Serbia
1905	18.5	21.7	14.4	12.3
1906	21.8	22.5	15.7	14.3
1907	14.9	10.1	9.8	9.2
1908	17.5	12.5	15.1	12.2
1909	14.2	14.1	12.5	17.5
1910	19.3	23.0	15.7	13.4
1911	20.7	20.1	17.5	16.1
1912	19.3	17.5	15.5	....
1913	19.6	21.0	17.6	....
1914	13.3	8.9	9.2	....
Average 1905–14	18.0	17.1	14.9	13.5[a]

* Data from *International Yearbook of Agricultural Statistics, 1913–14.*

[a] Seven-year average.

The average deviation of yield in Roumania from the ten-year average was 26.9 per cent; in Bulgaria 18.5 per cent, and in Hungary 14.1 per cent. Instability of yield in Roumania was thus twice as great as in Hungary, and considerably more than in Bulgaria.

The reasons for these large fluctuations in yield in the Danube basin in general and in Roumania particularly are the climatic conditions, and the extensive character of the agriculture. In Roumania, in the eastern regions, the amount of precipitation is the lowest, and in addition agriculture is more extensive in its methods than in Hungary, where in Trans-Danubia and on the small plain the agricultural methods are more advanced. Regions with more diversified farming have larger yields of wheat per acre than regions with a larger preponderance of cereals. Thus, for example, after the war, in Hungary the highest yield of wheat per acre was in Trans-Danubia; on the Alföld the yield was lower. In Roumania the highest yield was in Bucovina and Transylvania, and the lowest in Bessarabia. In Jugo-Slavia the highest yield was in northern Jugo-Slavia, north of the Danube and the Sava.

[1] Between 1870 and 1900, there was a perceptible tendency for yield per acre to increase in Hungary and Roumania. But from 1900 to 1914 no such tendency was apparent; yield per acre seems to have fallen to a low level during the war; and since the war the trend is on the whole indeterminate, though recovery from the war level at least to the pre-war level seems apparent in all countries but Roumania.

Diversification of farming improves and stabilizes the yield, but the dry climate of certain regions of the Danube basin may be considered as an important obstacle to successful diversification.

In all four of the Danube countries, winter wheat gives better yields than spring wheat, as is shown by the following figures in bushels per acre for the period 1923–27.[1]

	Winter wheat	Spring wheat
Hungary	19.1	14.5
Jugo-Slavia	15.7	11.5
Bulgaria[a]	13.3	10.6
Roumania	13.1	9.5

[a] Average for 1923–26.

Climatic conditions are more favorable to winter wheat throughout all the region, perhaps with the exception of Bessarabia. Hence spring wheat is seldom sown in the Danube basin.

General Characteristics of Danubian Wheats

In the Danube basin winter wheat is cultivated mainly; and spring wheat is decidedly uncommon. The winter wheat is broadly to be classified as hard winter wheat. Its kernels are rather small, red or reddish in color and of different degrees of darkness. The surface of the grain is more or less vitreous (glassy). According to the kind and color of its heads, Danubian winter wheat may be classified as bearded and unbearded; and these groups may be further divided into that with white heads, and that with red or dark heads.

The most common wheat is bearded wheat, the unbearded being less extensively grown. As to the color, white-headed wheat is sown most often. It is necessary to point out that the color of the head does not indicate the color of the grain; on the contrary, the wheat with white heads has grain of a darker red color than the wheat with heads which themselves are dark red in color. For this reason there may sometimes be misunderstanding when one speaks of "red" wheat, the color of the head being confused with the color of the grain. But this distinction is not of great importance; all Danubian wheats, so far as quality is concerned, belong to the general class of hard red winter wheat, and the differences are secondary.

In Roumania the wheats with white heads are regarded as of somewhat better quality, and are most common. They have smaller grains, and are heavier in weight per bushel and darker in color. To this group belongs the so-called Banat wheat, one of the most common in Roumania. The name itself shows this wheat to be of Hungarian origin, but it has long been cultivated from Roumanian seed. It is the most common wheat in the western part of Roumania on the Danubian plain. To the white-headed wheats belong also the so-called Old Roumanian wheat and the giant wheat, cultivated more in Moldavia. The last is regarded as one of the best varieties of Roumanian wheat because it is richer in protein than any other, as we shall see later.

The wheats with red heads are less common. Their grains are somewhat larger and lighter in color, and the grain is less vitreous. In general they are softer. Their weight per bushel, other things equal, is less than that of wheat with white heads.

Hungarian wheats have different names according to the regions in which they originated—Tisza wheat, Banat wheat, Pest wheat, and others. They may be regarded as varieties of the same kind of wheat with certain differences in quality—especially in protein content—which depend upon regional climatic conditions. We shall speak of them later in connection with the problem of protein percentage in the Danubian wheat.

Since spring wheat is rare in the Danube basin, there are no specific varieties of it. Spring wheat is grown mostly in Dobrogea and Bessarabia and is of Russian (Ukrainian) varieties — a bearded spring wheat with white heads, called *ghirka*, and an unbearded spring wheat, called *ulka*. Both belong to *Triticum vulgare*. In Dobrogea and in southern Bulgaria particularly, some durum wheat is grown, a kind of Russian durum called *arnaut*.

Experiments with soft winter wheats of western European sorts have always been unsuccessful in Hungary and Roumania. Soft wheat, which requires a longer growing season, is not fitted for the dry Danubian climate. It generally gives a relatively

[1] Data from official statistics of agriculture of corresponding countries.

low yield, and at the same time the grain is of poorer quality because it is lower in protein content. The experiments with soft wheat were designed to acclimatize wheats with larger yields, but in practice they gave smaller ones.[1]

Qualities of Danubian Wheats

Danubian wheats are fairly rich in protein, the result of climatic conditions. It is known that dry continental climate causes high protein percentage. A shorter period of vegetation, ripening during hot summer months, moderate precipitation during the period of growing—all these contribute to the production of a hard, vitreous wheat, rich in protein. With climatic conditions homogeneous through all the region, particularly over the Danubian plain, all Danubian wheats are fairly rich in protein. They contain much more protein than such west-European wheats as the German, French, and British, because the climate in those countries is more humid and not continental as in the Danube basin. But they are not so rich in protein as wheats grown farther to the east on the Ukrainian and Russian steppe, because the climate there is still dryer and more continental. They resemble the American hard winter wheats grown in Kansas and Nebraska, and, if well cleaned and uniformly graded, are capable of competing with these on a quality basis on European markets.

Hungarian and Roumanian wheats have been thoroughly studied with respect to their chemical content and other qualities. Unfortunately the most exhaustive study of Hungarian wheat, made in 1900–1906 by Professor T. Kosutany, is a little old, and no similarly elaborate studies have been made in recent years.[2] The Roumanian investigations are more recent, and cover as long a period as 15 years (1900–1914). Both studies fully covered the entire country and were designed to be representative for all wheats produced in those countries. As the study of Hungarian wheats was concerned with pre-war Hungary, it included also the characteristics of wheats of the main wheat-producing regions of post-war Jugo-Slavia north of the Danube and the Sava. Hence the facts are available for a detailed description of the characteristic qualities of Danubian wheats practically through the entire basin. Since Professor Kosutany's study covered 6 years, of which two were good (1901, 1905), two medium (1900, 1904), and two bad (1902, 1903), the results may be regarded as representative. Nor do they differ much from results obtained in earlier investigations of Hungarian wheats. The wheats studied by Professor Kosutany were each year from about 50 different localities in the principal wheat-producing regions of Hungary. The Roumanian study of wheat qualities was still more extensive and representative, covering a longer period and representing all the country much more thoroughly. More than 16,000 samples of wheat were analyzed in this investigation.

The following figures relating to weight and protein content are condensed from these inquiries:

Country and period covered	Weight of 1,000 kernels in grams	Weight per hectoliter in kgs.	Protein percentage[a]	Protein percentage[b]
Hungary (1900–1905)	32.56	77.92	15.36	12.26
Roumania (1900–1905)	32.63	77.4	13.44	10.73
Roumania (1900–1914)	32.49	76.63	14.10	11.25

[a] Protein per cent is given in percentage of dry substance excluding natural moisture of wheat, which is about 12–13 per cent. Protein is determined by multiplying by the coefficient 6.25 the percentage of nitrogen found in wheat grains. The weighted average of protein content for the entire country is calculated by taking into consideration the importance of the corresponding regions in the production of wheat.

[b] Protein analyses in the United States and Canada are commonly made of wheat containing around 13.5 per cent of moisture, and the nitrogen content of such wheat is multiplied by the factor 5.7 in order to reach the protein percentages. Protein percentages for United States hard red winter wheat, when ascertained on this basis, may possibly average for a period of years somewhere between 11 and 13 per cent, and similar percentages for Canadian hard red spring wheat somewhat higher. If we translate the average protein percentages for Danubian wheats as shown above, based as they are upon dry substance and a factor of 6.25, into percentages based on moisture content of around 12.5 per cent and a factor of 5.7, it appears that Danubian wheats are not far different in protein content from American or Canadian, though if anything a little lower. Unfortunately precise comparisons are not feasible.

The quality of wheat in both countries, taking the averages for all sections, is very

[1] Pollatsek, *op. cit.*, pp. 38–39.

[2] In 1928 the Hungarian government began new inquiries into the qualities of Hungarian wheats in a special institute directed by Hankoczy Jeno. The results of this research will be published later.

similar. The principal difference is in the percentage of protein, which is higher for Hungarian wheat. We give the data for Roumania as the average for 6 years and for 15 years, because the quality of wheat fluctuates considerably from year to year. For better comparison of the two countries it is reasonable to utilize data for the same years. On the other hand, data for the longer period of 15 years are more representative.

For the 6-year period the weight of 1,000 kernels of wheat and the weight of a hectoliter of wheat for both countries are about the same, but the protein percentage in Roumania is about 2 per cent lower. A 15-year period average gives more favorable results for the protein content of Roumanian wheat, but leaves it still more than 1 per cent below Hungarian. The problem is to decide how representative both characteristics are.[1] In both countries, the quality fluctuates greatly from region to region and from year to year.

In Roumania the quality of wheat, especially its protein content, increases from west to east. The largest percentage of protein (above 15 per cent) is found in the wheats of the Moldavian level tableland along the river Prut, particularly the districts of Jassy and Botosani, and in wheat from the Danubian plain east of Bucharest, and from Dobrogea.

The wheats on the western part of the Danubian plain in Roumania, and from the hilly regions, contain less than 14 per cent protein, generally between 13 and 14 per cent, but seldom less. The areas where protein content is high correspond to the localities where the yearly precipitation totals less than 24 inches and often less than 20 inches.[2]

In Hungary also the quality of wheat as characterized by the protein content is different from region to region. Generally speaking, the quality of Hungarian wheat improves from northwest to southeast. The regions particularly famous for the best quality of wheat in Hungary are the large valley of the Tisza (Tisza wheat), and the two regions called Banat and Backa which now belong to Jugo-Slavia and partially to Roumania. For these regions the analyses of Professor Kosutany show that protein content usually runs above 15 per cent, and often as high as 18 per cent in the Tisza valley in Banat.

The western regions and the northern hilly regions grow wheat with lower protein content, corresponding to their more humid climatic conditions. The whole southern part of the Tisza valley, and Banat and Backa, have the driest climate, with yearly precipitation below 24 inches.

Fluctuations in the percentage of protein content from year to year are caused by fluctuations in the weather. Years with relatively little rainfall during May and June and with warm summers result in wheat with a relatively large percentage of protein. The two other characteristics of wheat, weight per 1,000 kernels and weight per hectoliter, are correlated with the percentage of protein. Regions having wheat with relatively high protein content yield wheat of relatively small kernels, so that in years of high protein content, the weight per 1,000 kernels of wheat is relatively low.

The average weight of 1,000 kernels of wheat in Roumania fluctuated during the

[1] A sharp controversy occurred between Professor Kosutany and Professor A. Zaharia. (See Dr. Zaharia's *Der rumänische Weizen* [Bucharest, 1911].) The principal reasons why Professor Zaharia regarded Professor Kosutany's data as not quite representative for all Hungarian wheat are: (1) that Kosutany took more samples from the regions known for the good quality of their wheats, and had not covered the regions of wheat of poorer qualities in proportions appropriate to their part in the total production; and (2) that Kosutany had taken only a few samples of wheat grown on small farms, while at the same time he included several samples of wheat from the fields of agricultural schools, even though Kosutany himself had proved that peasants' wheat was poorer in protein content (about 1 per cent) than wheat from large estates. For these reasons, Zaharia insists that the characteristics of Hungarian wheat given by Kosutany are more favorable than they would be if the samples were more representative.

One may admit that Professor Zaharia's objections have some grounds, and on the other hand that the study of Roumanian wheat is the more representative. However, Professor Kosutany's study also gives a very good picture of the quality of Hungarian wheat, especially because in Hungary wheat produced by peasants and in the regions which produce little is less important than wheat grown on large estates and in large producing regions. These were the wheats used on the larger markets and for export.

[2] As wheat production on the western part of the Danubian plain in Roumania is very extensive, the large quantity of wheat produced there with comparatively low percentage of protein (13–14 per cent) decreases the average per cent of protein content in Roumanian wheat through all the country. On the other hand, wheat production in the Moldavian districts of Roumania giving the best wheat is comparatively smaller.

15-year period from 27.75 grams in 1914 to 36.91 grams in 1913.[1] More often it was nearer to the average, some 31–33 grams. The average weight of 1,000 kernels fluctuated from district to district from 29.82 grams in Constanza (Dobrogea) to 35.95 grams in the district of Muscel and 35.79 grams in the district of Mehedinti, both of which are in the hilly region of western Roumania. Small-grained wheat was found in the regions of wheat rich in protein and large-grained wheat in the regions of wheat low in protein.

The weight of a hectoliter of wheat fluctuated in Roumania during the 15-year period from 72.55 kilograms in 1914 to 79.09 kilograms in 1904 and 1909. By districts, it varied from 73.74 kilograms in Constanza (Dobrogea) to 78.03 kilograms in Vaslui (Moldavia). Fluctuations in the weight of 1,000 wheat kernels in pre-war Hungary during the six years 1900–1905 were from 28.76 grams in 1901 to 34.39 grams in 1903, and by districts from 22.60 grams to 43.16 grams. Fluctuations in the weight of a hectoliter of wheat were from 76.47 kilograms in 1901 to 81.13 kilograms in 1904; by districts, from 70.50 kilograms to 83.95 kilograms.

No such thorough studies have been made of the qualities of wheat in Jugo-Slavia and Bulgaria. However, the best wheats of Banat and Backa, with protein content above 15 per cent, are now grown in and exported from Jugo-Slavia.

Chemical analyses of Bulgarian and Serbian wheats were made by Professor M. Maercker of Halle, Germany.[2] He found that the protein content of Bulgarian wheat was 13.8 per cent (in relation to dry substance, excluding the natural moisture of the wheats), and of Serbian wheat, 13.7 per cent. The results are close to those obtained for Roumanian wheats. It is difficult to say how far the samples of wheat analyzed were adequately representative.

[1] Average percentage of protein in 1914 was 14.54, in 1913, 12.91—a negative correlation with the weight of grain.

[2] Kosutany, *Der ungarische Weizen*, p. 95.

[3] Djebarow, *Cleanness of Our Export Wheat* (Sofia, 1914. In Bulgarian). He studied 145 samples of *Triticum vulgare* and 36 samples of durum wheat obtained from the grain exchanges in Varna and Bourgas.

[4] "Calitatea Recoltelor din Anul 1924–25" and "1926–27," *Buletinul Agriculturui*, I, Nos. 1–3, 1926; and V, Nos. 8–9, 1928.

Studies of the qualities and the purity of Bulgarian wheat exports made before the war[3] show that Bulgarian wheat had even smaller grains than Hungarian and Roumanian. The average weight of 1,000 grains of the samples studied was 30.56 grams for northern Bulgaria and 28.44 grams for southern Bulgaria. The average weight of a hectoliter was 74.3 kilograms for northern Bulgaria and 74.0 kilograms for southern. The analyses showed very unfavorable results with respect to the purity of Bulgarian wheats. The average admixture of foreign substances was as high as 12.8 per cent; but of this 7.7 per cent was rye, and 0.6 per cent broken wheat grains. Other admixtures constituted 4.5 per cent. A large admixture of rye is a general characteristic of Bulgarian wheat, particularly on the northern Danubian level land. Southern wheats are cleaner. In the regions which produce grain for home consumption, it is common practice to grow a mixture of wheat and rye.

A high percentage of rye in wheat is also characteristic of Dobrogea in Roumania. In other Roumanian regions wheats are somewhat cleaner, though the percentage of admixture is high enough. An analysis of more than 300 samples of wheat from all regions of the country made by the agricultural experiment station in Bucharest for 1925 shows that the percentage of admixture by regions fluctuated from 2.3 per cent in Transylvania to 9.5 per cent on the Danubian plain and 10.5 per cent in the Moldavo-Bessarabian region. The analysis of 1927 showed better results, with admixture fluctuating from 2.4 or 2.5 per cent in Transylvania to 6.1 per cent on the Danubian plain and in the Moldavo-Bessarabian region.[4] Complaints concerning the dirtiness of Roumanian wheat from peasants' land are common. After the agrarian reform the percentage of wheat produced by peasants became larger, and this tended to affect the purity of Roumanian wheat unfavorably.

Wheat from Hungary and northern Jugo-Slavia is considerably cleaner. High requirements established by the Budapest grain exchange have educated producers toward better cleaning of their grain. Furthermore, the percentage of wheat produced on large estates in Hungary is high,

and large estates have better methods of cultivation and better machinery for cleaning wheat.

In general, the wheat exported from the Danube basin compares unfavorably with that of Canada, the United States, Argentina, and Australia with respect to freedom from admixtures of foreign substances. Like wheat from Russia and India, it is often subject on the import markets to considerable discounts on account of dirt and dockage.

Selection and Improvement

The work of selection and improvement of wheat varieties is farthest advanced in Hungary. We have seen that experiences with the introduction of new kinds of wheat of western European types gave, in general, unfavorable results. At present activity is directed rather to improvement and selection from local types of wheat which are better fitted for the climatic conditions of the Danube basin. Experiments are directed toward the problem of obtaining varieties with better yields.

At first experiments were made with wheat from the more humid regions of Hungary—with Somagy wheat from western Hungary, and with Dioszeger wheat from regions at present in Czecho-Slovakia. The newly developed varieties gave better yields, but their vegetation period proved longer, and therefore they could not be introduced generally into the dryer regions of Hungary. Moreover, their quality is not as good as that of the Tisza and Banat wheats.

Of much greater importance are the selections from Banat and Tisza wheats, which began somewhat later. The breeders tried to retain the short period of vegetation and the high quality, but to improve them in the direction of larger yields and by removing certain defects such as weak straw and susceptibility to rust.

The best-known breeder of wheat in Hungary is E. Szekacs in Arpadholom, who has produced many improved kinds of wheat. The Hatvan seed-breeding society is also well known in Hungary. Several kinds of wheat grown extensively in Banat and Backa are known under the name Szekacs. Several state organizations are working on seed breeding. The central state seed-breeding station of Hungary is in Magyarovar, in the northeastern corner of Hungary not far from Vienna, and is connected with the agricultural college situated there.

During the past 10 years new sorts of wheat have come on the market and many of them are widely used. The Ministry of Agriculture has issued much propaganda in behalf of the improved seeds, and distributes them among the farmers. The results obtained from seed distributed by the Ministry of Agriculture in 1923 were very favorable. The seeds distributed were produced by the two private breeders mentioned above.

The other Danube countries are working in the direction of improving their wheat seeds and selection of better varieties of wheat. In Roumania these activities were begun before the war; V. C. Munteanu, Director of the Agricultural College near Bucharest, started this work in 1900, and it has been continued by him and others. In 1913 the National Society of Agriculture was founded, one of the purposes of which was to improve the selection of cereals. The National Society invited a Swedish specialist (H. Nilsson Ehle) who formulated the program for plant breeding for the National Society. The war put a stop to the work, but it was resumed thereafter. At present in Roumania several private stations study the selection and improvement of seed wheat. One of them was organized by V. C. Munteanu on his property near Bucharest; later work in this station was continued by Cipaianu. This station produced several varieties of wheat which are now in commerce, notably variety N. 148.

Other private stations are located in the new Roumanian provinces. Station Cenad in Roumanian Banat has produced certain varieties which are used in that region. Station Odvos, near Arad, has selected certain varieties from native Tisza wheat which are now used in the western level regions of Transylvania. Dr. Stephani's station in the district of Brasow in Transylvania, known for the advanced agriculture which was developed by German farmers of this region, has also worked in the selection of wheat.

The agricultural colleges of Roumania (in Bucharest, Cluj, and Jassy) also study problems of selection. The government re-

cently created a special Institute of Agronomic Research, intended to develop the stations for selection in different regions of Roumania, and to direct all similar activities in the country. Yet selection of wheat in Roumania is only in its beginnings. The private stations are with few exceptions located in the former Hungarian area of Roumania, and they duplicate in some degree the work of Hungarian private stations such as Szekacs. Meanwhile the important problem of selection to determine the wheat best adapted for the special climatic conditions of eastern Roumania, with its dry cold winter and insufficient rainfall, is far from solved.[1]

In Bulgaria there are seven agricultural experiment stations located in different regions of the country which are occupied with selection and breeding of seed. In connection with two-year agricultural schools for farmers there are demonstration farms. The Bulgarian Ministry of Agriculture is very active in introducing new kinds of wheat seed among the farmers, particularly the so-called N. 14 and N. 16 wheats.[2] The grain dealers expect that new seed distributed among farmers will give cleaner wheat.

In Jugo-Slavia the farmers of the most important wheat-producing region in Banat and Backa may successfully grow the seed produced in the seed-breeding enterprises of Hungary, because selection there is from the Banat wheats. The new varieties produced by Szekacs are much grown in this region of Jugo-Slavia. The purchase and distribution of improved seeds are organized by agricultural co-operative organizations. For instance, the co-operative society Agraria, an organization of farmers of German descent, is an important factor in the improvement of agriculture in Backa and Banat.

V. MARKETING AND TRANSPORTATION

The Purchase of Wheat on Local Markets

The purchase of grain from producers has different forms according to locality and to type of producer. Peasants sell their crops to small local merchants, while large producers sell their crops to larger merchants or their agents. Sometimes large producers sell their grain through the commission houses directly on the central organized markets.

Purchase of grain from peasants generally takes place on local markets, or directly in the village where the producer lives, by a local shop-keeper, a richer peasant, or a small grain dealer traveling through the villages. Again, the peasant may bring his grain to the railroad station or small town where one or several small grain dealers may be found; he may bring it to the weekly market in the nearest town or to the nearest railroad station or river post, where independent small grain dealers or agents of larger dealers purchase the grain.

If grain is purchased by a local village shop-keeper or richer peasant, it is ordinarily taken in payment of debts incurred by the peasant during the winter and spring, when he buys necessary goods on credit. In such cases the conditions of sale are least advantageous for the producers. The recent development of the co-operative credit system in the villages throughout the Danube countries is fundamentally an effort to abolish this system of grain sales to local factors.

Sales of grain on the weekly market in the nearest town, at railroad stations, or at river ports are very common in Roumania. In Hungary the importance of such weekly markets for grain is decreasing.[3] In certain localities these weekly markets still persist in Hungary, but other forms of grain purchasing are growing as this form declines.

Weekly markets are of such importance in Roumania that the government regulates the sales on such markets by a special law (the active law is that of May 11, 1913). According to that law the local markets are

[1] For further details on wheat selection in Roumania, see an article by Dr. N. Saulesco in the new publication *La Roumanie agricole* (Bucharest, 1929), pp. 357–87.

[2] Certain authorities (Professor J. Mollow) criticize a little this activity of the Ministry of Agriculture, saying that new kinds of wheat are introduced before they are sufficiently studied. They gave superior yields in 1927 but the quality of grain was not better, and new varieties are also not resistant enough to rust.

[3] T. Spitzer, *Die Organization des ungarischen Getreidehandel* (Leipzig, 1912), pp. 14–22.

under the control of the Ministry of Commerce through the regional chambers of commerce. Each market is directed by a local market commission of three members who are local dealers. They are designated by the Ministry of Commerce on the recommendation of the regional chambers of commerce. In rural localities, the members of such market commissions may be local farmers. For each market the Ministry of Commerce also designates official brokers; one of these is a member of the market commission. The brokers cannot buy on their own account, but are only intermediaries. The purpose of the law was to create independent intermediaries and to strengthen competition on the market, and thus to give small producers a fair market for their produce.

It is doubtful if the law always attains its purpose. It is difficult on a small market to build up the system of independent intermediaries and to create any considerable competition. The brokers have too limited a business on small markets to make them independent, and in practice they tend to become agents of larger dealers. Often these dealers advance the small sums which are required as security for the nomination of brokers. Such a broker, connected with some particular dealer, tends to bring the seller to his own dealer and to increase this dealer's purchases. Officially, they continue to be looked upon as official brokers, and their notations of sales (bordereau) are regarded as official documents.

These brokers meet peasants arriving with carts loaded with grain in sacks and offer them the price which dealers whom they represent are ready to pay. The competition of such brokers creates the market for peasants. After securing some information about the market, the peasant accepts the proposition of one or the other of the brokers. The latter writes out a slip indicating the names of purchaser and seller, the kind and quantity of grain, and the price. At the same time he takes samples of the grain and sends the seller to the warehouse of the dealer, where the grain is weighed and emptied from the sacks. The warehouses of local dealers are of a flat type, often of very primitive construction and without any mechanical means of unloading and elevating or handling the grain; there are bins, however. The broker receives for his service 1 per cent of the amount of the transaction. Purchasers on such weekly markets are the small independent grain dealers,[1] or the agents of larger grain dealers from central markets, or even the agents of the large exporting houses, some of which build up large purchasing organizations extending throughout the country. The local flour mills also send their agents to such markets to buy wheat.

Large producers do not sell their wheat on the weekly markets. Generally, larger grain dealers send their agents to visit the large estates to purchase their grain. Sometimes landlords or large renters sell their grain before it is harvested, during the winter and spring, and receive part payment in advance. However, through the development of bank credit, landlords now more usually receive credit from their bankers, and later, after the harvest, they send their grain on to the central market in the name of the bank, which in Roumania generally has a special selling department. The bank acts as commission agent for its clients; and this partially explains why, in the Danube basin and especially in Roumania, the banks have a large rôle in the marketing of grain.

The organization for selling wheat and other grains on certain local markets in northern Bulgaria (for instance, in Varna, Provadia, and other centers) is most interesting. The grain markets there are organized by the municipalities in the form of auctions. On each market there is a special inspector or auctioneer, and sales take place in a special building. Producer-peasants bring their grain sacked in carts and wait around the market building. They give samples of their grain to the auctioneer who puts in each sample the name of the seller and the quantity of his grain. All these samples are placed on a round table about which the purchasers are gathered. When all samples are ready, the auctioneer opens the sale; he takes each sample, announces the price, and passes the sample around the table to show it to all the buyers. Whoever offers the highest price ordi-

[1] Small independent grain dealers in Roumania are called speculators.

narily obtains the sample and the auctioneer announces his name. The seller transports the grain to the warehouse of the purchaser and receives payment.

But this system of local grain marketing is not common throughout Bulgaria. In most localities grain is sold by peasants to small buyers in the villages, or to grain dealers at railroad stations or in the nearest towns on whom the peasants call directly.

As was mentioned above, the importance of weekly markets has decreased in Hungary. The system of buying peasants' grain in Hungary in other respects differs little from that in Bulgaria and Roumania. The purchasers are the same, either local shopkeepers, or independent small grain dealers. Peasants bring their grain to the railroad station or river port, where small grain dealers have their warehouses. The larger grain dealers also organize the purchasing from peasants through their agents, especially on the great and small Danubian plains, where grain production is most extensive. Agents of the greater grain dealers receive early each day telegraphic instructions and price limits, which they have to follow.

In Hungary in the last decade before the war, co-operative selling of wheat and of other grain developed to some extent. The co-operative credit societies formed special warehouse societies, first formed in 1900, which built warehouses each capable of holding 15,000 to 30,000 bushels of grain. The construction of these warehouses was financed through the Central Co-operative Credit Association by the government, which loaned up to five-sixths of the cost of building. Before the war there were about 50 such warehouse societies in Hungary. These societies accepted grain for warehousing from their members and gave credit up to 75 per cent of its value. They sold the grain on a commission basis through the co-operative's representative on the grain exchange. Usually wheat was not kept separately in the warehouses, but was classified in four grades in common bins. However, separate bins might be obtained for relatively large quantities of grain. Co-operative selling of grain is still in the process of development in Hungary; as yet it is only in its beginning.

In Roumania after the war the purchase of wheat by co-operative organizations also developed. The purchasers are co-operative stores which buy from peasants generally for a definite price rather than on a commission basis. They buy grain for the co-operative stores or for delivery to the Roumanian army, only rarely for further sales to export. Credit co-operative societies buy no grain. In general, co-operative organizations in Roumania play only a secondary rôle in grain marketing. During the last five or six years, they have bought a total of 5,000–10,000 cars of wheat per year, some 1.8–3.7 million bushels.[1]

The extensively developed credit co-operative societies of Bulgaria (of the Raffeisen type) after the war attempted to enter the field of grain marketing. These societies are scattered throughout the country, being found in most of the larger villages; and therefore they could serve as collecting agencies. In 1920 the government went so far as to grant a monopoly of grain export to the co-operatives, but this was discontinued the following year. Since then the co-operative societies have undertaken grain purchasing independently. In 1922 they collected about 1,028,800 bushels of grain, in 1923 about 1,396,200 bushels.[2] But until recently, co-operative buying of wheat in Bulgaria had not been introduced into the marketing of grain to any great extent. Private dealers remain the principal factor on the grain markets, and only a small part of the grain is sold through the co-operatives.

The same situation exists in Jugo-Slavia, where co-operation is well developed in agricultural credit and in the purchase of goods for agricultural needs; but the sale of agricultural products, particularly of grain, remains predominantly in the hands of private dealers.

The Terminal Markets

The wheat collected by the small local grain dealers or by the agents of larger grain dealers moves forward to the larger central, terminal, or export markets. In Roumania these markets have chiefly the

[1] T. T. Tatos, *Marketing of Grain in the System of Co-operation* (Bucharest, 1927. In Roumanian).

[2] *The Agricultural Co-operatives and the Agricultural Bank of Bulgaria* (Sofia, 1924), pp. 56–57.

character of export markets, because before the war Roumania exported more than half her wheat. The central or terminal wheat markets are naturally located in the ports on the lower Danube accessible to sea-going ships. The larger Roumanian markets are in Braila, Galatz, and Reni. Other ports on the lower Danube accessible for maritime ships are Ismail, Kilia, Tulcea, and Sulina; these are small loading ports rather than central grain markets, and as markets they have only local importance. On the other hand, the principal Roumanian export port on the Black Sea, Constanza, is one of the important terminal grain markets of Roumania.

The ports on the Danube above Braila are not accessible to sea-going ships, but are only river ports. Some of them are important grain markets for the adjacent Danubian plain, as, for example, Giourgiou and Calafate; but their importance is chiefly local, for they serve principally as ports from which wheat is sent in barges to Braila finally to be loaded on the ships.

In Bulgaria the principal terminal grain markets are Varna and Bourgas, both on the Black Sea; Bulgaria has no port on the Danube accessible to sea-going vessels. However, many of her ports on the Danube have some importance as grain markets, and sometimes serve as export ports for Bulgarian wheat. Such are Widin, Lom, Orjechovo, Sistov, and Ruse.

The central grain markets of Jugo-Slavia and Hungary have a somewhat different character. They were not so expressly export markets as were the Roumanian markets before the war. Pre-war Hungary was likewise a large exporter of wheat, but her exports more often took the form of wheat flour; hence in Hungary relatively more wheat was sent to the interior where the centers of the flour-milling industry were located, primarily to Budapest. Furthermore, Hungarian exports of wheat grain were mainly confined within the border of the old Austro-Hungarian monarchy, and for this reason Hungarian markets in general had the character of interior grain markets. After the war, with Austria and Czecho-Slovakia independent states, the central Hungarian markets, Budapest especially, assumed to a greater degree the character of export markets.

The principal central grain markets of Jugo-Slavia are Novi Sad (formerly Neusatz) on the Danube, Belgrade, Somobor, and Zagreb. Novi Sad is the principal grain market of Banat and Backa, and since these constitute the principal wheat-producing region of Jugo-Slavia, it became the principal wheat market of Jugo-Slavia. Belgrade is rather a central market for the Old Serbian region.

The chief factors on the central or terminal markets are the larger grain dealers, the exporters, and the commission houses. Wheat collected by independent small grain dealers is sold on the central market to larger grain dealers or to exporters, generally through the agency of the commission houses. Wheat collected by agents of exporters or of larger grain dealers also is directed to terminals for its disposition.

In Roumania the banks often act as commissioners on terminal markets. If a bank finances the local grain dealer, he sends his grain to an agent of the bank, and it is sold by the bank to the exporters or larger grain dealers. The larger grain producers who obtain credit from the banks also send their grain for sale through their bankers on the terminal market. The rôle of banks as commission agents on the terminal grain market is very important. Perhaps it was even more important before the war, when large estates produced and exported more wheat. Other private houses also act as commission agents on the terminal markets, though in Roumania banks are more important.

The rôle of a commission agent is very important on the terminal grain markets. He is the bond between the local grain dealer and the exporter or large grain dealer. He often finances the local grain dealers. Some commission men sometimes transact business on their own account, but this is not common.

Commission agents sell the grain on the terminal market through official brokers. Such official brokers are connected with the grain exchanges (or with the chambers of commerce in Roumania), which exist on all the principal terminal markets in Roumania, Bulgaria, and Jugo-Slavia. On the Budapest grain exchange the sworn brokers act only on the futures market; on the Budapest cash market there have been no sworn brokers since 1897.

The rôle of official brokers is of considerable importance in Roumania, particularly in Braila, where there are no special buildings for grain marketing and this is transacted in the offices of official brokers or on the street around these offices. All brokers' offices in Braila are located on a street parallel to the quay on the Danube.

Official brokers cannot enter into a grain transaction on their own account. They receive a fixed percentage for their function, in Roumania one per cent of the amount of the transaction. They are not permitted to compete one with another by lowering their commissions, though there are certain indications that such competition does exist especially with regard to larger transactions. Generally, brokers are more closely associated with sellers (commission agents) than with buyers. Each seller has a broker through whom he generally acts. In Constanza this connection of brokers with certain commission houses is clearly indicated; the brokers' offices are located in the offices of the commission agents (principally banks) in the grain exchange.

Purchasers of wheat on the terminal markets in Roumania and Bulgaria are mainly exporters, because the markets in both of these countries are export markets. The milling industry is not concentrated in certain localities, but rather is dispersed through the country and supplies itself directly with wheat from local markets rather than from terminals. This is quite the opposite of conditions on the central Hungarian grain market of Budapest, where millers are the principal buyers of wheat.

Exporters in the Roumanian and Bulgarian terminal markets may be divided into two groups: large international houses such as Louis Dreyfus of France, the Compagnie Continentale of Antwerp, Strasser and König, Neufeld and others; and local export houses less known internationally, but which are connected with foreign houses or banks, particularly for the purpose of financing their export transactions. Another classification of exporters may be made. There are export houses which have their own large organizations for purchasing grain through the entire country, and which buy most of their grain directly on local markets from the producers through their agents, or through local small grain dealers whom they finance. There are other exporters who do not have an elaborate purchasing organization on the local markets, but buy their grain on terminal markets through commission agents. Exporters belonging to the first group, of which Dreyfus and the Compagnie Continentale are examples, sometimes buy grain on the terminal market in larger lots from other grain dealers, but this is not their principal method.

In Bulgaria the same large concerns have never organized their own large purchasing organizations, chiefly because the Bulgarian export grain market has been too small to pay the expenses of so elaborate an organization.

This system of purchasing grain by export houses exists in Jugo-Slavia also; but there, as in Hungary, such a firm as Dreyfus or the Compagnie Continentale does not operate, because exports are usually directed up the Danube to the central European markets, principally to Austria and Czecho - Slovakia, and houses connected rather with Hungarian, Austrian, and German capital operate. Vienna and Budapest banks particularly are engaged in grain marketing and exports within the territory of the old Austro - Hungarian monarchy, and, as we have seen, their activities are sometimes extended even to the Roumanian markets.

The larger grain dealers who purchase wheat in Banat and Backa for the deficiency regions of Jugo-Slavia, such as Bosnia, Dalmatia, and Slovenia, buy it on such terminal markets as Novi Sad and Sombor, through the brokers on the grain exchanges, the same as do the smaller Jugo-Slavian export houses.

In Hungary, on the central or larger provincial markets, in addition to local small grain dealers, there are the medium and large grain dealers. This classification perhaps was a result of the fact that on the chief Hungarian market in Budapest, very large flour mills appeared as buyers. They required large quantities of fine homogeneous wheat, and preferred to buy it in large lots from large grain dealers on the Budapest grain exchange rather than in small lots from many small dealers.[1] Between

[1] T. Spitzer, *op. cit.*

the large dealers of Budapest and small local grain dealers in the country, operates a group of middle-sized dealers, whose rôle on the market is important. After buying wheat from local small dealers who have no facilities for classifying, cleaning, and mixing grain, they perform these operations and then sell the better qualities to large Budapest dealers, and the medium qualities to the provincial millers or local buyers. The transactions between the large and middle-sized grain dealers take place in a business-like manner on the grain exchange, through arrangements made by telegraph and telephone. Between the middle-sized and small local grain dealers, the business dealings are concluded through more personal relations, and here transactions in wheat are more often based on samples.

The present position on the Danubian grain markets of international export houses or of firms connected with foreign houses or banks is stronger than that of local exporters, because the former have better facilities for obtaining foreign credit. Credit in the Danube countries, especially in Roumania, Bulgaria, and Jugo - Slavia, has been disorganized since the war. The monetary systems were not settled until recently, money was depreciated, and the foreign exchanges fluctuated widely. Credit accommodation from local banks is very expensive. In Roumania the official limit of a bank credit rate has been fixed at 18 per cent; but only the houses with the best credit standing may hope to secure loans even on such terms. Roumanian grain dealers and exporters without foreign connections have to pay 24 per cent for credit, sometimes even more, while the international export houses, or the houses connected with foreign banks, may obtain credit for 7, 8, or 10 per cent.

It is estimated that four-fifths or more of the Roumanian grain exports are financed by foreign capital. The same is true in Bulgaria. There, when an exporter needs local money, he offers local banks foreign exchange for a certain time and by this means obtains necessary credit in local money to pay for the grain. Thus even interior credit transactions are made in stable foreign monetary units or in foreign bills of exchange. Hence the foreign export houses finance the grain trade to even the smallest buyer, sometimes advancing to the small grain dealer up to 50 per cent of the value of his contract. Advances in such a case are not secured because they are given before grain is purchased, and exporters have sometimes suffered considerable losses.

A general characteristic of the Danubian grain trade is the very close connection of banks with the grain trade. We mentioned above the rôle of a bank as that of commission agent in Roumania. In Bulgaria banks do not enter so directly into grain marketing, but limit their activity rather to financing. The Bulgarian Agricultural Bank, however, takes a direct part in the marketing of agricultural products.

Hungarian banks engaged directly in grain marketing before the war. The Ungarische Escompto und Wechsel Bank remains an outstanding factor in the Hungarian grain trade. Since the war the direct activity of Hungarian and Austrian banks in grain marketing has become perhaps even more extensive than before. Perhaps the narrowing of the general field of activity for Vienna and Budapest banks that followed the dismembering of the Austro - Hungarian monarchy necessitated a move in this direction. They finance and organize grain marketing, not only within the limits of the old Austro - Hungarian monarchy, but also in Roumania and Bulgaria, where they finance local dealers suffering from lack of capital and credit. The banks of Vienna and Budapest have been directly connected with Jugo-Slavian banks from pre-war times. At present the Jugo-Slavian banks are formally independent, but in fact they are closely connected with Hungarian and Austrian banks.

Grain Contracts: The F.A.Q. System

Exports of wheat from the Danube basin flow in two main directions. One is down the Danube through the lower Danubian ports accessible to sea-going ships, or through the Roumanian and Bulgarian ports on the Black Sea. The other direction is up the Danube to the central European countries, Austria, Czecho - Slovakia, and southern Germany. Exports from Roumania and Bulgaria go principally in the first

direction, exports from Hungary and Jugo-Slavia chiefly in the second.

In the first direction the Danube basin is connected with the western European grain markets through the Mediterranean route. Accordingly, in the export grain trade of Roumania and Bulgaria the forms of grain contracts used are those approved on the principal grain markets of western Europe, principally those of the London Corn Trade Association, the German-Netherland contracts, those of the Antwerp Chamber of Arbitration, and those of the Association of the Grain Trade of Genoa.[1]

The contracts used on the west European markets are not applied to grain moving up the Danube in the direction of central Europe. Here the conditions of the grain trade are different, and transportation is regulated otherwise than is maritime transportation. Before the war the bulk of the Danubian grain trade on the middle Danube was confined within the limits of the old Austro-Hungarian monarchy, and was domestic rather than international. It was regulated by the usages of the principal grain exchanges of Austria and Hungary, Budapest and Vienna. After the war the grain trade on the middle Danube became more international in character, and the forms of contracts and of transactions could not be sufficiently standardized by the exchanges which are now located in different states and are controlled by different governments.

In order to introduce some uniformity into the business relations, and especially to standardize the contracts, efforts were made to formulate a typical Danubian grain contract. Such a contract was initiated by the exchange in Vienna, and was discussed in a special conference in which all interested countries took part. It was also the subject of discussion in the principal Danubian grain exchanges and chambers of commerce. It was not accepted officially by all the Danubian exchanges, but has begun to be used.

This Danubian grain contract applies to sales of wheat and corn transported in barges on the Danube, and aims to formulate the principles about which there are certain differences of opinions. Much attention is paid to the unification of transportation practices, for instance, the regulation of the option of a buyer to direct a barge laden with purchased grain up or down the Danube to a port not previously fixed by the parties of contract. The contract states the conditions of compensation of a seller when delivering grain below contracted quality in weight per bushel or in percentage of admixture, and establishes the principle, common to most of the western European grain contracts, that the buyer is obliged to accept grain of poorer quality, but is entitled to discount. The buyer may refuse to accept grain only when its weight per 100 liters falls more than 5 kilograms below the specification of the contract. The conditions of payment and of sample taking, and other details as well, are likewise stipulated in this contract. The usages of the Danubian exchanges are accepted by the Danubian contract as supplementary regulations when the contract does not provide specifically for the case.

According to all western European contracts, Danubian wheat and wheat from the Black Sea is treated generally on the basis of fair average quality (F.A.Q.) at the port and at the time of loading, but to some extent is sold on sample. No official certificate such as those of Canada or the United States is accepted as a formal guarantee of grade.[2] The standards of fair average quality of the wheat in the ports of loading at the time of loading are not established by the exchanges or authorities at the exporting ports, as would seem to be logical, but in the ports of unloading. Such stand-

[1] Specifically, the contracts in use are forms 48, 49, 50, 51, and 52 of the London Corn Trade Association; forms 1 and 1*a* of the German-Netherland contracts; form 14 of the Antwerp contracts; and forms 5 and 6 of the Genoa Association of Grain Trade.

[2] In Roumania in 1928 a law was passed dealing with the standardization of grain (the law of May 8, 1928, No. 1, 309). According to this law the government is authorized to introduce standardization and inspection of grain, first with grain intended for export. From the time of introduction of the system no grain will be permitted to leave Roumania without a certificate issued by the official inspectors. It is doubtful whether these certificates would be recognized at once on the foreign market as a final guarantee of quality. Even in Roumania dealers engaged in the grain trade are not unanimous in approving the law, but are rather opposed to it. Some regard it as premature; others fear that grain elevators would be monopolized by a single company connected with political groups. It is difficult to say how soon this law will be executed; and some think that it will never go into effect.

ards are prepared by the London Corn Trade Association and often are consulted, not only in London, but also in other European grain markets if locally prepared standards are lacking. The Antwerp Chamber of Arbitration also establishes the fair average quality standards for Danubian wheat for each month; and in case of arbitration, it compares the samples of wheat delivered with the standard for the month in which the wheat was loaded. The standards of the Genoa Association of the Grain Trade are taken into consideration in any dispute on the quality of Danubian wheat unloaded in Genoa. The German-Netherland contract, however, states that the arbitration commission must take into consideration standards established by the exchanges of the exporting ports; but in practice the market authorities of the receiving ports usually decide disputes relating to quality of the Danubian grains. Thus all disputes concerning grain transactions for export from the Danubian and Black Sea ports are solved according to the rules and by the arbitration commissions of western European markets. The authority of the grain exchanges in the exporting ports of the Danube region does not stand high in the international grain trade.

If the Danubian wheat is sold for export upon the F.A.Q. standard, the natural weight of wheat is generally fixed in the contract, as is the percentage of foreign admixture (dockage). Sale of Danubian wheat by natural weight is very common. Wheat is not sold as of type or on protein content.

Grain Exchanges

On the principal grain markets in the Danube basin commercial exchanges are organized. In the cities where the grain trade is the most important trade, these commercial exchanges assume the character of grain exchanges.

The chief grain exchange in the Danube basin is at Budapest. It was founded under the name Kornhalle as early as 1854 by the Pester Lloyd Society as a private organization. In 1868 it became a section of the Budapest exchange, and a grain futures market was organized. Since Budapest is the largest milling center of Europe, it has become an important futures market. It is interesting to note that the futures market at Budapest continued uninterrupted until the war, while the futures market at Berlin was discontinued in 1896 and at Vienna in 1903. In 1926 the futures market at Budapest was again opened. Before the war, purely speculative transactions on the Budapest futures market were thought to involve only a small part of the total transactions; most transactions in futures were hedges placed by millers and grain dealers.[1] How far this condition prevailed then or now prevails is not clear; but the volume of trading is probably reduced, and it is said that some Hungarian millers now hedge at Chicago. The liquidation of transactions in futures is facilitated by a special liquidation bureau, a clearing house. Buying and selling of futures is through the official brokers. The futures delivery months are September, October, and November in the fall, and March, April, and May in the spring.

The Budapest grain exchange likewise is an important sample market for cash grain. The principal buyers are the millers of Budapest and the exporters on the central European markets. Vienna importers are represented on the Budapest market by special agents or branch houses. Each member of the exchange may act as an intermediary on the Budapest cash grain market. Sworn brokers on the cash market were discontinued in 1897, but the professional intermediaries are registered with the counsel of the exchange as grain agents. However, there is little specialization on the Budapest exchange; brokers often act as buyers on their own account.

The grain exchanges of adjacent wheat-deficiency regions are likewise of importance for the Danube basin. Vienna is one of the most important importing markets, and for this reason the Vienna grain exchange is an important factor in the Danubian grain trade. Another important market is at Prague in Czecho-Slovakia. Bratislava (formerly Pressburg), also in Czecho-Slovakia, is an important market for the Slovakian surplus grain region on the small Danubian plain. The Bratislava grain exchange is also the transit market for the Danubian wheat from Hungary and Jugo-Slavia passing into Czecho-Slovakia.

[1] T. Spitzer, *op. cit.*

This wheat is imported into Czecho - Slovakia principally up the Danube, through the port of Bratislava, which has been considerably developed by the Czecho - Slovakian government and is the base of the Czecho-Slovakian Danubian river fleet.

The main grain exchanges of Jugo-Slavia are in Novi Sad, Sombor, Belgrade, Zagreb, and Lubliana. The last two are in the wheat deficiency regions of Jugo - Slavia. The Novi Sad and Sombor exchanges, on the contrary, are in the principal exporting region; therefore the importance of these exchanges is greater even than that of Belgrade, where grain from the old Serbian region is mainly sold. Novi Sad is located in the center of one of the largest surplus regions of the Danube, Banat and Backa. Here exporting houses connected with Vienna and Budapest banks, and grain dealers on the interior markets supplying grain to the deficiency regions of Jugo-Slavia are represented. Transactions in cash grain on the market in Novi Sad are made through sworn brokers or agents. A futures market is contemplated on the exchange in Novi Sad; transactions in futures are now made privately. Some dealers think that to open a formal futures market would regulate the speculation in futures grain, which now is devoid of any regulation and may take unsound forms.

On the Roumanian terminal markets, the grain trade is organized in the chambers of commerce. With these are registered the sworn brokers through whom the transactions in cash grain are concluded. There are practically no official market buildings; the business is done in the offices of the brokers or in the streets around these offices. In Constanza near the harbor there is a special building where the offices of the commission houses and of brokers are located, and where grain trading takes place daily. Arbitration commissions are organized in the Roumanian chambers of commerce. There are no officially organized futures markets in the Roumanian chambers of commerce, but transactions for future delivery are nevertheless common.

The most important chamber of commerce for the grain trade is that of Braila; Galatz is rather an import market and a market for the export of timber. The second important grain market is Constanza; the Bucharest exchange is of little importance.

The Bulgarian grain exchanges, or general commercial exchanges, are organized in Varna and Bourgas, both exporting ports on the Black Sea. On these exchanges there are markets for cash grain sold through sworn brokers. No organized futures market exists in Bulgaria.

Transportation Conditions

The peasants bring their wheat to the warehouses of small grain dealers or purchasing agents of larger companies, usually located near a railroad station or a river port. The wheat is drawn in carts by horses or oxen; in Bulgaria, Old Roumania, and certain localities of Jugo-Slavia, by oxen more commonly than by horses. Hauling by horses in two-horse carts is increasing, but peasants generally continue to haul grain in ox-carts in bags, and pour it out in the warehouses of the buyers. Motor trucks have not been introduced.

The highways and public roads in the Danube countries are rather primitive. Few have macadamized surfaces with foundations of crushed stone, and on these the binding material is invariably sand from a neighboring river. Only the national and some of the principal district roads are of this type. Secondary roads are seldom macadamized, and are ordinarily made of dirt either with no surfacing or with nothing other than sand and gravel. In certain regions on the Danubian plain it is difficult to secure materials to build macadamized roads. Even in Hungary, which in most ways is farther advanced than the other Danube countries, only about a fifth of the roads is macadamized on the Danubian plain.

During dry weather such roads fairly well serve the needs of the rural population, but during the wet season the roads often become so bad that grain cannot be hauled. For instance, in Bulgaria to haul grain after November is practically impossible, and the same is true in many other regions. Hence the first and principal season of grain hauling is during August, September, and October, before the beginning of the wet season. The second and less important season begins in the spring, after March.

The primitive character of the public roads especially affects grain transportation because the railroad systems are not well developed in the Danubian countries. It is true that railroads are complemented by river ways, but there remain many localities far from either the river ports or the railroad stations.

Railroads. The railway mileage and its distribution in the Danubian countries in 1926 was as follows:

Country	Total mileage	Miles per 100 square miles	Miles per 10,000 inhabitants
Hungary	5,295	14.8	6.3
Roumania	7,052	6.1	4.0
Jugo-Slavia	6,221	6.6	5.0
Bulgaria	1,445	3.7	2.6
Total	20,013	7.1	4.5

Only in Hungary is the railroad system comparatively well developed. Here a farmer generally does not need to haul his grain farther than 7 to 10 miles to reach the nearest railroad station. In Roumania and Jugo-Slavia, with about 6 miles of railroad to each 100 square miles of area, a farmer often has to haul his grain 15 or 20 miles, and in Bulgaria perhaps as far as 25 miles or more. In level regions the railroad network is naturally more closely knit than in the hilly regions. Under such circumstances, the condition of public roads is an important factor in grain marketing.

It is not only the problem of further development of the railroad system that confronts the Danube countries, but also the problem of improving the present system and better supplying it with rolling stock. Roumania and Jugo-Slavia, composed as they are of several areas belonging previously to different states, received from their predecessors railroad systems which do not adequately connect their present parts. For example, the railroad system of Transylvania converges to Budapest, and is rather poorly connected with the railroad system of pre-war Roumania; and now that Transylvania is separated by a state frontier from Hungary, the Roumanian government must make efforts better to connect the Transylvanian region with Danubian ports and with the Black Sea. Again, when Bessarabia was a part of Russia, its railroad system was constructed in such a manner that it was well connected with the Russian port of Odessa, through which Bessarabian grain was exported. Now Bessarabia is cut off from Odessa by frontiers, and the direction of railroads is not adapted to facilitate exports from Bessarabia through the Danubian ports. The small Danubian port of Reni, which is not well developed and the equipment of which is inadequate, has become the principal outlet for Bessarabian grain.

A similar situation exists in Jugo-Slavia. The railroad system of northern Jugo-Slavia, especially that of Banat and Backa, was built to connect it with Budapest and not with Serbia. In Hungary, very important railroad junctions such as Subotica (formerly Szabadka), Arad, and Nagyvarad were lost, and consequently the Hungarian system was disrupted. Such complications of railroad systems resulting from frontier changes make for inefficiency. The Roumanian and Jugo-Slavian governments are making efforts to reconstruct their railroad systems in conformity with the new boundaries, but this will require considerable time, work, and capital. Unfortunately for these countries, traffic lines do not necessarily follow frontier lines.

Furthermore, during the war the railways in certain localities, as in Old Serbia and in Roumania, were destroyed by military operations. Motive power, rolling stock, and bridges were destroyed or ruined. Reconstruction could not be accomplished in a short time, especially with the lack of capital and credit prevailing in the Danubian states. Even in 1927 experts estimated that the rolling stock of the Roumanian railroads must be doubled in order to perform their allotted work.

Nevertheless, the railroad systems of the Danube basin, combined with the river systems, give a comparatively good outlet for Danubian grain. The extensive river system facilitates the work of railroads.

The Hungarian plain and the northern part of Jugo-Slavia, as we have seen, are comparatively well supplied with railroads. The Roumanian plain for some distance along the Danube has a railroad line parallel to the Danube, with several lines joining it to the Danubian ports. The Roumanian

plain stretches along the Danube and is rarely more than 60 or 70 miles from the river. Among the important grain-producing regions far from the Danube is the Moldavian and Bessarabian tableland of Roumania. The Bulgarian northern level region also is crossed by the main Bulgarian railroad line going from Sofia to Varna. It connects the main agricultural section with the Black Sea port of Varna. Several short railroads unite this trunk line with the Danubian ports. The southern Danubian plain is connected with the second Black Sea port, Bourgas.

It is apparent that the principal task of the railroad systems in the Danube basin is to bring its products to the large Danubian river system. The chief movement of grain to foreign markets follows the Danube down or up current.

River Navigation. The Danubian region has a large system of navigable rivers, exceeding 3,500 miles. The Danube itself extends more than a thousand miles, from the Austro - Hungarian frontier to the Black Sea; but it is navigable still farther upstream through Austria and southern Germany, and presents a good outlet for exports to the wheat deficiency regions of central Europe. Through its lower ports the Danube furnishes an outlet for Danubian grain on the western European markets via the Mediterranean Sea.

The main Danubian waterway is connected with the great producing regions by a system of navigable tributaries. The Tisza crosses the great Danubian plain of Hungary and northern Jugo-Slavia, and is navigable for some 435 miles, about 311 miles within the limits of Hungary and 124 miles in Jugo-Slavia. It is the principal road for exports of surplus wheat from Banat. The Sava borders the Danubian plain on the south, and is navigable for 373 miles in Jugo-Slavia below Zagreb. The Drava also crosses the Danubian plain, between Hungary and Jugo-Slavia, but is navigable only for 93 miles. The distant region of Moldavia and Bessarabia is connected with the Danube, at the place where it becomes accessible to sea-going ships, by the Prut, which is navigable for 199 miles.[1] So vast a river system is inevitably a large factor in the transportation of grain from the Danube basin. It binds together all the countries lying approximately within its limits in a certain economic and commercial unity.

Danubian navigation, however, is not without its difficulties. Only comparatively lately has the Danube become a really great navigable waterway, and much remains to do in order to make it less imperfect.

Two principal obstacles confronted Danubian navigation. First, the channel in the Danubian delta was not deep enough, and it had to be deepened in order to permit sea-going ships to enter the Danube. Second, the rapids on the Danube at the Iron Gate were not navigable without regulation and canalization. The Iron Gate divides the Danube into two parts, the lower Danube bordering Roumania, and the middle Danube within the limits of pre-war Austria-Hungary; and navigation between them was interrupted. Improvement of Danubian navigation long encountered difficulties because the river lay within the limits of several countries, and international action was required.

In 1856, after the Paris peace, the European Danubian Commission for the Control of Danubian Navigation was organized. Through the efforts of this commission the Danubian channel was deepened and regulated. The passage of ships was facilitated through the Sulina branch of the river. At the time of the organization of the commission, the depth of water in the Sulina branch was only 6.9 feet, and ships of a registry of 200 tons had difficulty in passing without partial unloading. But during the last years before the war, the depth of the Sulina branch was maintained at about 24.0 feet, and ships of 1,500 to 2,000 tons entered the Danube easily. At present about a thousand ships enter the Danube yearly from the Black Sea to take on freight in the Danubian ports of Roumania. The average tonnage of these ships is about 1,500 tons.

The second difficulty of navigation, the rapids at the Iron Gate, was also partially removed. Navigation through the Iron Gate was opened in 1870, but further improve-

[1] The Dniester River may be termed navigable for about 373 miles, but navigation is difficult on account of the rapids. Furthermore, it is the state frontier between Roumania and Soviet Russia (Ukrainia), and is not used now for navigation.

ments were made up to 1896. At the most difficult section along the rapids a channel parallel to the Danubian current was dug. But even now there are always certain difficulties with navigation through the rapids. The depth of water is kept at about 6.6 feet (during the six years 1920–25, in sixty months out of seventy-two, the depth was not less than 6.6 feet); but the current is always so strong that an ordinary tug of 400 to 700 horse power can draw only one barge or at most two. It even happens in the Greben gorge that in times of high water two tugs are required to draw a single barge, while on the other stretches of the Danube one tug can draw from five to ten barges.

Also the cargo of the barges passing through the rapids has to be limited. Barges on the smoother stretches of the Danube have a capacity of 650 tons and a draught of 78.6 inches, though barges on the lower Danube, below the Iron Gate, are considerably larger, sometimes as large as 1,600 to 2,500 tons capacity. But the average load of barges passing the rapids is not more than 450 tons, that is, about two-thirds of the normal tonnage capacity of a Danubian barge. Again, the width of the channel hollowed in the river bed, about 197 feet, is not sufficient to permit the barges to pass one another without danger of collision, and one string of barges always has to wait at the entrance to the gorge for the other to pass through. These difficulties hinder navigation in the Iron Gates more than the lack of depth.[1]

It is thought that the traffic capacity at the most difficult places of the Iron Gate may comparatively soon become insufficient. It is now estimated at 2 to 3 million tons per season (some experts think 5 million tons), whereas the present traffic is nearly 1.5 million tons (1,095,000 tons in 1925, 1,251,000 tons in 1926, and 1,328,000 tons in 1927) and is increasing. Hence projects are advanced to improve radically the regulation of the rapids by canalization. Lately the Jugo-Slavian government, in order to facilitate the traffic in the Iron Gate, laid a railway along the bank to haul barges by locomotives. With this improvement there is an opportunity for considerable growth in the traffic through the Iron Gate. Dredging of the channel of the Danube is intermittently required in the quieter stretches, but such difficulties are not considerable.

Before the war the traffic through the Iron Gate down stream was the greater; but since the war up-stream traffic has been larger in most years. Bulky goods such as cereals, petrol, and timber are sent up stream, whereas more expensive and concentrated goods pass down stream. In a year with good crops in the basin, however, large consignments of cereals are dispatched down stream; in 1925 and 1926, for example, and again in 1929, a considerable quantity of cereals was exported from Jugo-Slavia down stream. On the other hand, in a year of poor crops in Hungary and Jugo-Slavia, Roumanian and Bulgarian grain is sent up stream and replaces the Hungarian and Jugo-Slavian grain on the central European markets, as occurred in 1927.

On the lower part of the Danube, in addition to traffic passing through the Iron Gate, there is considerable local traffic. Cereals from many ports along the Danube in Roumania and Bulgaria are loaded in barges and transported to the port of Braila, where they are transshipped. Transshipment in Braila from the barges is made by floating elevators, and costs less than transshipment from railroad cars. Consequently transportation by barges of grain from the western part of Roumania and Bulgaria is the most practicable method. To the upper Danubian ports in Roumania and Bulgaria, grain is often brought directly to barges by carts from the nearest producing regions.

The Tisza River and the system of the canals in Banat and Backa are likewise important. Most of the grain surplus from this rich region is loaded on barges and sent down to the Danube where it is redirected. A large percentage of grain loaded on the Tisza is destined for export, in 1923–26 about a half of the total.

Navigation on the Danube is assured by a considerable fleet of barges and tugs. There are several river transportation companies, and several governments are engaged in the transportation business on the Danube directly, as Roumania, Jugo-Slavia,

[1] N. Gijacintof, "The Djerdap Sector of the Iron Gates of the Danube," *Belgrade Economic Review*, November 1926, I, No. 3, and April 1929, IV, No. 4.

and Czecho-Slovakia. A considerable part of the Danubian fleet is controlled by these governments. In Austria and in Hungary, Danubian navigation is organized by large private companies which obtain subventions from the government (in Austria the DDAG, in Hungary the MFFR). Two German companies, the Bayerische Lloyd and the Süddeutsche Donau-Dampfschiffahrts-Gesellschaft, are also active on the Danube. The competition of these companies is sufficiently strong to provide the necessary facilities for grain transportation.[1] Some of the larger grain dealers have their own fleets of barges for the transportation of grain. Grain in barges is transported in bulk, as is true mostly on the Danubian railroads. Sacked grain is common only in the movement from farms to local markets, and when transfer is made without the use of elevators.

Terminal Facilities

Terminal markets of the Danube basin, as we saw above, may be classified as those connected with western European grain markets through the maritime route, and those connected rather with the markets of central Europe through the Danubian waterway. We may consider the terminal facilities in the Danube basin according to this grouping.

Roumania has three well-equipped ports for grain export. Two of them, Braila and Galatz on the Danube, serve not only to transfer grain from railway cars to the ocean-going ships, but also to transship from river barges. This is an advantage not shared by the Black Sea port of Roumania, Constanza, which is not within the Danubian river system and can receive grain only by railroad. Hence the lower Danubian ports obtain all grain transported on barges, which is necessarily large in amount on account of the manner in which the wheat-producing regions lie adjacent to the river system. On the other hand, Constanza and the Bulgarian Black Sea ports have an advantage in that they are open throughout the year, while Danubian ports are closed for two or three months during the winter. Moreover, maritime freight rates from the Black Sea ports normally are lower than from the Danubian ports, on account of certain risks and difficulties encountered by sea-going ships when entering the Danube.

The three principal Roumanian ports have modern grain elevators for transferring grain from railroad cars into ships, and for storage of grain. The capacity of the Braila grain elevators is about a million bushels, of Galatz grain elevators about .9 million bushels, and of Constanza elevators about 2.2 million bushels.[2] The elevating capacity of Braila and Galatz elevators is up to 1,000 tons a day of ten hours, and the shipping capacity up to 1,200 tons a day. At Constanza these capacities are even larger. All told, the capacities are above the requirement of actual Roumanian exports. Moreover, in addition to the loading of grain by means of elevators, other methods are extensively used, especially in Braila. The large quantities of grain brought to the lower Danubian ports in barges are transshipped by floating elevators of which there are about 40 in Braila and Galatz. They are located principally in Braila because barges from the upper Danube do not descend to Galatz, but stop at Braila. Galatz receives grain in barges only from Moldavia via the Prut River, which flows into the Danube a little below Galatz. Generally Galatz exports little grain, its principal traffic being exports of lumber and imports of general merchandise.

[1] Jugo-Slavia and Roumania since the war have reserved their Danubian cabotage (coastwise or "riverwise") traffic to national boats, and excluded the foreign ships. Several Danubian tributaries which within the new frontiers became interior routes, such as the Sava and the canals in the northern Jugo-Slavian plain, are also closed to Austrian and Hungarian navigation.

On the other hand, Hungarian, Austrian, and German navigation companies organized in 1926 the so-called Betriebsgemeinschaft, a system of co-ordination of activity which permits all parties to it to utilize in some measure in common the tugs, barges, and harbor facilities, and to organize the most important ports as union ports. This arrangement limits competition among the navigation companies and at the same time decreases their costs. Agreements among the Danubian navigation companies existed before the war, but the new agreement of 1926 perhaps goes a little farther. What will be the result of this agreement is difficult to say, though in 1927 it worked satisfactorily.

[2] In Constanza there are two elevators working now, each of 30,000 tons capacity. A third elevator also of 30,000 tons capacity is built, but the machinery is not installed. A fourth elevator is only begun; the foundation is laid, but construction has gone no farther. The capacity of the two completed elevators is sufficient for the present exports of Roumania through Constanza.

The transfer of goods at both Braila and Galatz takes place principally along the river bank. The length of landing space is about 1.9 miles in each of these ports. The connections between the ships and the shore, which has a paved inclined embankment, are by means of floating piers along the river; and between the shore and barges anchored farther out, by means of connecting gangways.

In addition to these facilities there are large basin-docks which are under the control of customs officials, where stored imported merchandise may remain two years without payment of duty, since this is a bonded warehouse area. The grain elevators are situated in the basin-docks, away from the shore, but the transshipment from barges to ocean-going ships takes place along the shore of the river. Here also ships are loaded directly from railroad cars or from the flat warehouses which are so numerous in Braila. The grain from the flat warehouses, situated along the Danube and connected by special tracks with the main railroad system, is hauled in small one-horse wagons, and from the carts the bags are carried individually by men on to the ship.

Although a floating grain elevator or a dock silo will handle in one hour about the same amount or more than would a crew of eleven men in a working day, the old system persists. However, transshipment by floating elevators is the most common method used in Braila; loading by hand from the carts is used rather for local grain bought on the local market of Braila. Generally an ocean-going ship is loaded from both sides; one or two floating elevators transship grain from the barges, and at the same time on the other side the longshoremen load grain from the carts. In Constanza, grain is loaded mainly by the grain elevators, but there also the method of loading directly from the carts or cars is used. In 1925–27 from 10 to 15 per cent of all grain loaded in this port was by hand.

The transshipment capacity of each floating elevator in a 10-hour day is about 1,000 to 1,200 tons. Thus a ship-load of 4,000 to 5,000 tons, which may be regarded as the usual size for ships entering the Danube, may be loaded in two days when two floating elevators are used at the same ship.

The cheapest method of transshipment in the Danubian ports is from the barges to the ships. During the summer of 1928, such transshipment cost about half a dollar per ton. The unloading of grain from railroad cars through grain elevators, and loading it on the ocean ships (including 10 days' storage) costs about 60 to 70 cents per ton; and to unload grain from railroad cars in warehouses by hand and to load it on ships by longshoremen costs about $1.70 per ton. These are the costs at Braila, which exports most of the Roumanian grain.

Port Reni, situated a little below Galatz on the left bank of the Danube, serves at present as the main outlet for Bessarabian grain, but has no modern port facilities. It is a simple river port where ships are loaded from cars by carters and longshoremen; no grain elevators and only a few simple flat warehouses are found. It became an export port for Bessarabian grain only because of its better railroad connection with the Bessarabian hinterland.

The Bulgarian Black Sea ports, Varna and Bourgas, are not equipped in so modern a manner as the Roumanian ports. No Bulgarian port has a grain elevator, and even flat warehouses are not present in sufficient numbers. In Varna, grain is often stored on open platforms along the shore of the port. The transfer of grain from cars to ships is always by hand. To load a ship with 5,000 to 6,000 tons of grain requires about 4 or 5 days in Bulgarian ports. It costs from 80 to 90 cents to transfer a ton of grain directly from railroad cars to the ship. If grain passes through the flat warehouses or open platforms, the transshipment cost is from $1.20 to $1.30 per ton.

The principal terminal grain markets of Jugo-Slavia and Hungary are connected with ports on the Danube, and grain warehouses, principally of the flat type, are located in these ports. In Jugo-Slavia, the principal grain warehouses are in the landing ports of the northeastern Jugo-Slavian plain. Beckerek, on the Beg channel in Banat, has the best grain warehouses in Jugo-Slavia; the facilities are also good at the Danubian port Zemun near Belgrade, and the port of Osziek on the Drava where it joins the Danube. One of the principal Jugo-Slavian terminal grain markets on

the Danube, Novi Sad, has no extensive grain warehouses; the construction of such a warehouse is projected, especially in connection with the intention to open a futures market on the Novi Sad exchange.

The principal terminal market of Hungary, Budapest, is sufficiently supplied with storage facilities for grain—perhaps in excess of the actual requirement because the milling industry of Budapest now works only at 20 to 25 per cent of its full capacity. The principal grain warehouses are connected with the Danube more frequently than with railroads, for grain usually arrives in Budapest by the Danube route. There are two large grain elevators in Budapest. One belongs to the Ungarische Escompto und Wechsel Bank, and has a storage capacity of about 3,000,000 bushels, with electrical machinery. The other belongs to the municipality. In 1928 a grain elevator in the new commercial and industrial harbor of Budapest was started, with a storage capacity of 1,200,000–1,300,000 bushels. The new commercial harbor of Budapest, a type of basin-dock, is located on the left bank of the Danube in the southern part of Budapest. It is destined to be the free port of Budapest, where foreign merchandise may be kept without payment of customs duties. This harbor is being built by the Hungarian state because, in connection with post-war political conditions, the Budapest market has acquired a more international character than it had before the war.

All told, it may be said that the Danube basin is equipped with adequate terminal facilities for the handling of its present grain surpluses.

VI. DOMESTIC UTILIZATION AND FLOUR MILLING

Crops and Their Disposition

Certain difficulties arise in any attempt to compare the disposition of the wheat crop in the Danube basin between pre-war and post-war periods. The production of grain within the new boundaries may be compared with sufficient accuracy with the production of grain within the same borders in pre-war years, but the statistics of grain exports in pre-war and post-war years cannot be compared directly because of the changed political and customs frontiers. Consequently, as pre-war exports of grain from the countries in their actual post-war frontiers cannot be estimated, it is also impossible to reach reliable estimates of the pre-war domestic utilization of grain within the post-war frontiers, and only rather rough comparisons are possible. This hampers analysis of one of the leading problems regarding the region—why the situation changed so radically after the war, and the exports of grain from the Danubian countries, which constituted so large a percentage of the total production before the war, became so small a proportion thereafter. It is difficult to determine whether the causes were only on the side of production (decreased outturn), or also on the side of consumption (increased domestic utilization).

That decreased production is a very important factor may nevertheless be seen from the following figures, which show, for post-war boundaries, wheat production in the periods 1909–13, 1923–27, and 1925–29, in million bushels.[1] The five-year average production of wheat in 1923–27 in the Danube basin fell nearly 65 million bushels below the pre-war production, chiefly in Roumania. An increase of production appears only in Jugo-Slavia. If we employ a different post-war average, taking the period 1925–29, which excludes the bad year 1924 and includes the excellent crop of 1928, the post-war production still falls below the pre-war by over 26 million bushels; but Roumania accounts for all of the decrease.

Country	1909–13	1923–27	1925–29	Increase (+) or decrease (−)	
				1923–27	1925–29
Bulgaria	37.8	34.8	41.0	− 3.0	+ 3.2
Hungary	71.5	68.6	78.9	− 2.9	+ 7.4
Roumania	158.7[a]	97.0	102.5	−61.7	−56.2
Jugo-Slavia	62.0	65.1	81.0	+ 3.1	+19.0
Total	330.0	265.5	303.4	−64.5	−26.6

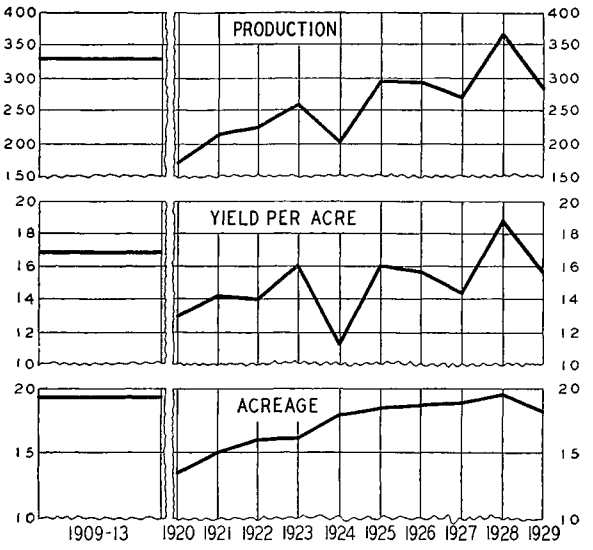
[a] Four-year average.

[1] Summarized from data of the United States Department of Agriculture.

Chart 2 is inserted to illustrate the fluctuations in acreage, yield per acre, and production in the Danube basin as a whole during the years 1920–29, in comparison with the 1909–13 averages.

CHART 2.—WHEAT PRODUCTION, YIELD PER ACRE, AND ACREAGE IN THE DANUBE BASIN, AVERAGE 1909–13 AND ANNUALLY FROM 1920*

(Million bushels, bushels per acre, and million acres)



* Based on data in Appendix Table III.

The decline in production between 1909–13 and 1923–27 may be explained partially by the decreased area sown to wheat, though only in a small degree. During the period 1923–27 the area sown to wheat was only 7.4 per cent smaller than the average area of 1909–13, while wheat production was 19.5 per cent smaller. Except in Roumania,[1] the areas under wheat were on the average larger in the post-war period than before the war. In any event the decline in area does not suffice to explain all of the decrease in the production of wheat.

A more important factor than decrease of area was the decrease in yield of wheat per acre. We have seen[2] that yield per acre in all Danube countries was lower after the war than before, particularly in Roumania, though other countries, especially Hungary, during recent years had about recovered their pre-war yields. It was otherwise with Roumania. Here the yield per acre was each year considerably lower than the pre-war average of 16.7 bushels per acre. Evidently this cannot be explained exclusively by poorer weather conditions in Roumania than elsewhere during these years, for in the entire Danube basin weather conditions are to a considerable degree similar, and the yields in other Danube countries did not remain at such low levels as in Roumania. Evidently transfer of land from large estates to small holders and the maladjustment of producers to the new conditions are also responsible in some degree.

Clearly the decline in Danubian wheat production has been due mainly to the decreased outturns in Roumania. Of the total decrease of 64.5 million bushels between 1909–13 and 1923–27, 61.7 million occurred in Roumania. We shall see that this decrease in production is the chief, though not the only, cause of the smaller exports.

Four Danubian countries in their pre-war frontiers—Bulgaria, Hungary, Roumania, and Serbia—exported annually during the five pre-war years 1909–10 to 1913–14[3] about 110 million bushels of wheat and flour as wheat. This is nearly 80 million bushels more than was exported annually from Hungary, Bulgaria, Jugo-Slavia, and Roumania in their post-war boundaries during the period 1923–27. It is impossible, however, to compare these figures precisely because of the change in frontiers.

Thus, to say nothing of the change in frontiers between the Danube countries themselves, the entire territory covered by the four Danube countries in the post-war frontiers does not correspond exactly to the territory covered by the four Danube countries in the pre-war period. The post-war territory includes Bessarabia and Bucovina on the east, and on the west certain areas of Jugo-Slavia (Dalmatia, Bosnia, Herzegovina, Slovenia, and Montenegro), none of which lay within the territory of the four pre-war Danube countries. On the other hand, pre-war Hungary included Slovakia, which is now a part of Czecho-Slovakia and does not enter into the territory of the Danube basin as we have defined it here.

[1] According to the data of the United States Department of Agriculture, the decline in Roumanian acreage was about 1,482,600 acres; but data of the International Institute of Agriculture place it somewhat smaller, about 1,161,380 acres.

[2] See above, pp. 229 ff.

[3] For Serbia, the three pre-war years 1909–10 to 1911–12.

Nevertheless, these differences in the total territory are not very important, and perhaps counterbalance one another from certain points of view. The annual average production of wheat during 1909–13 in the territory covered by the four Danube countries in their post-war frontiers has been estimated, as we have seen, at 330.0 million bushels. During the same period, the annual average production of the four Danube countries in their pre-war frontiers was about 315 million bushels—a slightly smaller figure principally because Bessarabia, which now belongs to Roumania, produced more wheat than Slovakia, which before the war belonged to Hungary but now is a part of Czecho-Slovakia.

Almost all of the wheat exported from the Danube countries, in pre-war as in post-war years, was destined to territories lying outside of the Danube basin. Only a small amount of wheat was marketed from one of the four Danube countries to another.[1] Therefore total exports of wheat from pre-war Hungary (not Austria-Hungary), Roumania, Bulgaria, and Serbia may reasonably be regarded as the exports from the Danube basin as a whole, as we define it for post-war years to include Hungary, Roumania, Bulgaria, and Jugo-Slavia. Thus the exports of wheat from the Danube basin in pre-war times may roughly be estimated as about equal to 110 million bushels, as against the post-war exports (1923–27) of about 32 million bushels; and this difference of about 78 million bushels may be taken as approximately the decrease in the exports from the Danube basin (within the new frontiers). Hence over 80 per cent of the decline in exports may reasonably be explained by the decline in production, which itself resulted chiefly from a decline in the wheat yield per acre in Roumania.

Consequently only 20 per cent or less of the decrease in wheat exports from the Danube basin needs to be explained by other factors than crop production. For this purpose it is necessary to discuss other components of disposition, such as seed requirements and home consumption.

[1] There was, however, a large export of wheat from Roumania into Hungary in 1909–10, a result of a crop failure in Hungary in 1909.

[2] See above, p. 228, for detailed discussion of seed requirements.

[3] See Munteano's article in *La Roumanie agricole* (Bucharest, 1929), published by the Ministry of Agriculture of Roumania.

Seed Requirement

The data on seed requirements per acre are about as follows for the several countries of the Danube basin.[2]

	(Pounds)	*(Bushels)*
Bulgaria	201	3.35
Hungary	156	2.60
Roumania	161	2.68
Jugo-Slavia	143	2.38

The quantity of seed used per acre in Bulgaria may seem unduly high; but in Bulgaria sowing by hand is more common than in the other Danube countries, and sowing by hand requires about 30 per cent more seed than sowing by drill. The figure was determined by official agricultural statistics, and the International Institute of Agriculture has employed about the same quantity in its presentation of pre-war data. The wheat seed requirement of 156 pounds (2.60 bushels) per acre in Hungary is accepted by the Hungarian Central Statistical Office in its calculation of the crop disposition. The figure for Roumania rests upon the opinions of experts,[3] and involves the supposition that a third of wheat is sown by drill, and two-thirds by hand. The estimate of seed requirement per acre of 143 pounds (2.38 bushels) for Jugo-Slavia may seem rather low; but it is based upon a special survey made in 1927 by the Ministry of Agriculture, which covered all the districts of Jugo-Slavia. The estimate is the more reasonable because the principal wheat-producing region of Jugo-Slavia is in the northern part, where sowing by drill is almost a universal practice.

Taking these requirements of seed per acre, we reach the following total seed requirements per year, in bushels, by countries, on the average, for the five crop years 1923–24 to 1927–28:

Bulgaria	8,760,000
Hungary	9,987,000
Roumania	21,307,000
Jugo-Slavia	10,622,000
Total	50,676,000

Subtracting the estimated average seed requirements from the average production,

we obtain the quantities of wheat which each of the Danube countries had available for home consumption and for export. Table 11 gives the disposition figures in terms of averages for the five years 1923–24 to 1927–28, which are far enough from the war to be regarded as comparatively normal years.

TABLE 11.—ANNUAL AVERAGE PRODUCTION, SEED REQUIREMENTS, EXPORTS, AND APPARENT DOMESTIC CONSUMPTION OF WHEAT IN THE DANUBE COUNTRIES, 1923–24 TO 1927–28*

(Thousand bushels)

Countries	Production	Seeding	Remainder for domestic consumption and export	Wheat grain net exports	Wheat flour net exports[a]	Home consumption	Population, 1925	Per capita consumption
Bulgaria	34,770	8,760	26,010	912	970	24,128	5,277	4.57
Hungary	68,559	9,987	58,572	9,556	9,214	39,802	8,283	4.81
Roumania	96,980	21,307	75,673	4,590	3,574	67,509	16,970	3.98
Jugo-Slavia	65,094	10,622	54,472	5,702	1,596	47,174	12,603	3.74
Total	265,403	50,676	214,727	20,760	15,354	178,613	43,133	4.14

* Based so far as possible on official statistics of the several countries.
[a] In terms of wheat.

Leaving for the moment the discussion of the export problem we come to the subject of home consumption of wheat in the Danube basin.

HOME CONSUMPTION OF WHEAT

The problem of home consumption of wheat in the Danube basin is complicated by the fact that the diet in the Danube countries differs greatly from region to region. Wheat is used generally as the principal food grain in two of the four countries, Hungary and Bulgaria, and in the northern part of Jugo-Slavia. Here it is consumed in the form of yeast-leavened bread of the central European type. Practically throughout Roumania and in a large part of Jugo-Slavia the principal human food grain is corn, which is consumed as meal boiled in water to form a sort of thick porridge (*mamaliga*). Rye is an important bread grain in a considerable part of Hungary, and in southern Serbia and Slovenia in Jugo-Slavia. Last of all, barley is the principal food grain of the population in southern Bosnia and Herzegovina in Jugo-Slavia, where it is consumed in the form of firm, rather flat, baked loaves or cakes.

With such differences in the diet of the population and without good statistics of consumption in certain of the Danube countries, it is difficult to arrive at definite conclusions concerning possible changes in home consumption of wheat over the past two decades. It is especially difficult to evaluate the influence of any changes in home consumption of wheat with regard to their effect on wheat exports.

The figures below show annual average per capita consumption of wheat in bushels in the Danube countries for the designated periods before and after the war.[1]

Countries	1904–05 to 1908–09	1909–10 to 1913–14	1904–05 to 1913–14	1923–24 to 1927–28
Bulgaria	3.59	5.82	4.70	4.57
Hungary	(4.77)	5.16	(5.02)	4.81
Roumania	(1.31)	3.08	(2.57)	3.98
Jugo-Slavia[a]	2.84	....	(3.16)	3.74

[a] Serbia for pre-war years.

It is desirable again to recall that the post-war frontiers of the several countries do not correspond to the pre-war frontiers. This relates particularly to Jugo-Slavia and Roumania, which now include larger territories, with populations often different in their customs from the populations of pre-war Serbia and Roumania.

The post-war per capita wheat consumption in Bulgaria and Hungary corresponds strikingly to the pre-war per capita wheat consumption over the ten-year period 1904–05 to 1913–14, but it is below the figure

[1] Data for pre-war years from *Annuaire international de statistique agricole*, 1913–14. Figures in parentheses are averages which do not cover the entire periods noted in the column headings.

for the five years just preceding the war. On the other hand, post-war per capita consumption of wheat in Jugo-Slavia and especially in Roumania is higher than pre-war consumption. The meaning of these figures is not the same in each country. The statistics for Bulgaria may be regarded as the most satisfactory because the change in the frontiers and in population was less important than elsewhere. One may reasonably conclude that post-war per capita consumption of wheat in Bulgaria was smaller than in the years just preceding the war, though it was considerably larger than in the earlier pre-war years. Such a conclusion is in accord with the general decrease in purchasing power of the Bulgarian population since the war.

The fact that per capita consumption of wheat in post-war Hungary is on the same level or a little below the per capita consumption of pre-war Hungary may indicate that in fact consumption of wheat within the limits of the new borders of Hungary has decreased. Certain lost areas of old Hungary, such as Slovakia and Transylvania, consumed less wheat than the part of Hungary lying within the post-war frontiers. In Slovakia consumption of rye has always been more common; and in Transylvania the Roumanian population has always consumed more corn than the Hungarian population, and the Roumanian population was more than half of the Transylvanian population.

Thus per capita consumption in the two Danube countries in which wheat is the principal bread grain seems to have declined. In Hungary, the decline in the consumption of wheat may have been somewhat compensated for by the increased consumption of rye, which is more commonly used there than in other Danube countries. This appears from the following figures, which show annual average per capita rye consumption in bushels for the designated periods.[1] In Bulgaria, however, the per capita consumption of rye has declined somewhat.

Corn is comparatively little used as human food by the people of Hungary and Bulgaria. Only in northwestern Bulgaria, where the population is in some degree Roumanian, has consumption of corn for human food ever been extensive.[2] In other Bulgarian and Hungarian regions corn could not replace wheat in the human diet.

In comparison with the decline of per capita wheat consumption in Bulgaria and Hungary, it is striking to observe an apparent increase in per capita wheat consumption in Roumania and Jugo-Slavia. But here the apparent increase of per capita wheat consumption does not signify a true increase in per capita consumption among the populations of pre-war Roumania and pre-war Serbia. It is rather a statistical result of the fact that the population of territories included after the war in Roumania and Jugo-Slavia is a population more accustomed to eat wheat than the population of pre-war Roumania and Serbia. For Roumania there are no statistics of grain consumption, but one may nevertheless demonstrate this fairly conclusively. In Transylvania, Bessarabia, and Bucovina there has always been a considerable percentage of non-Roumanian population—in Transylvania, Hungarians and Germans; in Bessarabia and Bucovina, Ukrainians and Germans. These groups have never used as much corn as the Roumanians, and their per capita consumption of wheat has always been higher than that of the Roumanians. As a result the general per capita consumption of wheat in these new regions of Roumania is now higher than in pre-war Roumania, as it was also higher before the war. It is this addition of territory which results in the apparent increase in per

Countries	1904–05 to 1908–09	1909–10 to 1913–14	1904–05 to 1913–14	1923–24 to 1927–28
Bulgaria	.75	1.18	.97	.87
Hungary	(1.42)	1.51	(1.48)	2.05
Roumania	....	(.07)	....	.31
Jugo-Slavia[a] ...	.33	....	(.36)	.39

[a] Serbia for pre-war years.

[1] Data for pre-war years from *Annuaire international de statistique agricole*, 1913–14. Figures in parentheses are averages which do not cover the entire periods noted in the column headings.

[2] K. Popoff, a Bulgarian statistician, estimated that in one of the northwestern districts of Bulgaria (Lom) about 70 per cent of the cereal food consumption consists of corn. See L. G. Michael, *Cereal Crop Situation in Bulgaria*, a mimeographed report published by the Division of Statistical and Historical Research of the U.S. Department of Agriculture.

capita consumption of wheat in Roumania within her post-war frontiers as compared with pre-war Roumania.

For Jugo-Slavia a special statistical survey of grain consumption for human food[1] is available to support the above reasoning. Post-war per capita wheat consumption in the principal wheat-producing regions of Jugo-Slavia (Banat, Backa, and Srem) was placed at almost 7.35 bushels, while in Old Serbia it was placed below 3.67 bushels, as it was before the war. In Old Serbia corn is used as the principal food grain. Furthermore, the people in such new Jugo-Slavian territory as southern Bosnia and Herzegovina consume barley extensively for food; in certain districts barley is the principal bread grain, and less than 1.84 bushels of wheat are consumed per capita. However, the wheat-eating population of northern Jugo-Slavia that was added to Serbia is more numerous than the barley-eating population of Bosnia and Herzegovina, and it is this change in boundaries that at least in part results in a per capita wheat consumption in Jugo-Slavia within her post-war boundaries higher than the per capita wheat consumption of pre-war Serbia. But all this indicates nothing about a possible change in per capita wheat consumption in Old Serbia.

On the whole it is rather difficult to believe that per capita wheat consumption in Old Roumania and Old Serbia has averaged higher in post-war than in pre-war years and that this would explain in any considerable degree the decrease in the Roumanian (or the Danubian) exports of wheat.

As an explanation of the high proportion that domestic wheat consumption is of total production in post-war Roumania as compared with pre-war Roumania, other reasoning is sometimes used. It is stated that new Roumania now includes certain wheat deficiency regions, to which wheat produced on the territory of pre-war Roumania is moved, particularly to Transylvania. This reasoning, however, seems to exaggerate the deficit of the new regions. Of all new provinces of Roumania perhaps only Bucovina is really deficient in wheat; here per capita production of wheat (after subtracting the seed requirement) was, on the average during 1923–27, as low as 1.10 bushels. But the population of Bucovina is only 5 per cent of the total population of Roumania. Bessarabia, on the other hand, was always before the war a wheat surplus region of Russia. As concerns Transylvania, only certain parts of it, the Transylvania in strict meaning, is a wheat-deficiency region. If we consider that Roumania acquired from Hungary not only the Transylvanian province in the strict meaning, but also the eastern part of Banat and the level area of the Hungarian plain west and northwest of Transylvania, which are the second richest wheat regions of new Roumania, then Transylvania in this larger meaning cannot be regarded as a wheat deficiency area. Indeed, the annual average per capital production (seed requirement subtracted) of wheat in Transylvania in its larger meaning was as high as 4.37 bushels. This figure is higher than the average per capita wheat consumption for all of new Roumania, 3.98 bushels, and not far from the average per capita wheat consumption in post-war Hungary, 4.81 bushels. And the majority of the Transylvanian population are Roumanians who consume less wheat than Hungarians. Thus we may conclude that the addition of wheat deficiency regions does not explain satisfactorily why home consumption of wheat in new Roumania constitutes a larger percentage of production than was true in pre-war Roumania. Decreased production of wheat in Roumania apppears to be the more important factor, though one must consider the growth of population (within post-war boundaries) between the pre-war and the post-war periods.

As concerns Jugo-Slavia, it now includes not only such rich surplus wheat areas as Banat, Backa, and eastern Slavonia (Srem), but also such deficiency areas as Slovenia, western Croatia, Dalmatia, and certain regions of Bosnia and Herzegovina. Production of wheat in these provinces has long been insufficient to cover their requirement of wheat. Since the war their deficit in wheat is covered by surplus wheat from northeastern Jugo-Slavia and partially from Old Serbia. Hence, in spite of the fact that Jugo-Slavia now includes the richest

[1] *Consumption of Bread Grain in Jugo-Slavia* (Belgrade, 1928). This survey was published in Serbian by the Jugo-Slavian Ministry of Agriculture.

surplus wheat region of old Hungary (Banat, Backa, and Srem), not much wheat is exported. Wheat from Banat and Backa, which before the war was largely transported to Budapest to be used in the large flour mills there, is now partially transported to the deficiency regions of western Jugo-Slavia.[1]

In conclusion, we may say that in the Danube basin as a whole the per capita domestic consumption of wheat for food after the war was no greater than pre-war consumption. The population in Roumania and in certain regions of Jugo-Slavia has not shifted radically from the consumption of corn to the consumption of wheat. In Roumania and in a large part of Jugo-Slavia, corn continues to be the principal food grain. Even if per capita consumption has not increased, however, the total population, within identical boundaries, has increased considerably. The data are not available to permit accurate measurement of the growth of population, but the broad fact that it has grown, and grown rapidly, is hardly open to question. The explanation for the decline in wheat exports from the Danube basin between the pre-war and post-war years is, as we have seen, to be accounted for largely by the decline in wheat production; but in so far as population growth alone is concerned, the decline in exports was in some part due to growth of domestic consumption.

These conclusions perhaps require some qualification, but rather with respect to the statistical data than to the facts themselves. It is easily possible, for example, to secure somewhat different numerical results with regard to per capita consumption by summarizing annual data on wheat production and seeding into periods of different length from those employed above. Thus per capita consumption in the period 1923–24 to 1928–29 appears higher than it was in the period 1923–24 to 1927–28, for the Danubian crop of 1928 was a huge one, and exports were small. But to include data for 1929–30 would presumably reduce the figures again, for production was smaller and exports (apparently) much larger.

Again, we have not treated all of the items of disposition, notably the use of wheat for animal feed, and changes in stocks. The average level of stocks may have been either lower or higher in 1923–27 than it was in the pre-war periods, and if so would affect the comparisons made above respecting actual consumption; but the evidence is not at all clear. But on the whole there is no reason to suppose that the level of stocks (considering periods, not particular years) could have changed appreciably. As to the consumption of wheat for animal feed and the changes in such consumption since the war, it is clear that this factor cannot be important, for wheat consumption for animal feed in the Danube basin is negligible. Even other grains are not extensively used for animal feed in several regions and so changes in feed use would involve corn, oats, and barley rather than wheat. The number of animals is now somewhat smaller than in the pre-war years, but methods of feeding seem not to have changed perceptibly.

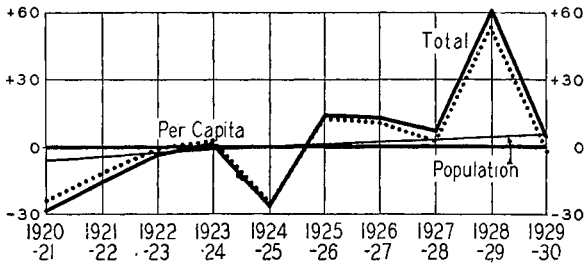
Finally, we have not considered any possible trend in per capita consumption during such post-war years as have already elapsed. Chart 3 (p. 258) shows total domestic utilization (crops minus net exports and seed), per capita utilization, and population in the Danube basin as a whole for the past decade, in terms of percentage deviations from the average 1922–27. Upward tendencies for the stated period are apparent both in total and in per capita domestic utilization, though per capita utilization has not tended to increase as rapidly as total utilization. This upward tendency in per capita utilization is the result chiefly of a general recovery in crop production over the period, and does not imply that in the Danube basin as a whole there has appeared any marked tendency for wheat to replace corn, barley, or rye in the customary diet of the population.

[1] Mr. L. G. Michael in his publication *The Danube Basin* (U.S. Department of Agriculture Bulletin No. 1234) points out the deficiency of wheat in these Jugo-Slavian provinces. Perhaps he exaggerates the deficiency in some of these provinces, notably Slovenia and Dalmatia. He seems to have accepted too high figures for per capita consumption of grain for these provinces (7.50 bu., or 205 kgs.). The survey of the consumption of grain in Jugo-Slavia made by the Jugo-Slavian Ministry of Agriculture places the consumption of wheat in these provinces considerably lower—for Slovenia from 4.26 to 4.85 bushels, and for Dalmatia from 5.03 to 5.66 bushels per capita. This perhaps explains why the post-war exports of wheat from Jugo-Slavia have proved a little larger than the surplus of wheat for export estimated by Mr. Michael for pre-war years.

Chart 3 is also of interest in that it suggests that exports from the Danube basin in post-war years have not fluctuated closely in accordance with the size of the wheat crop. Rather, the apparent domestic consumption tended to be large in years when the crops were large, and small when the crops were small; and exports showed less striking variations. The precise manner in which Danubian crops are utilized cannot be made clear in the absence of adequate data on carryovers, feed use, and food use. It is striking that the huge crop of 1928 did not lead to unusually heavy exports, but seemingly was employed to build up stocks and to expand food and feed use of wheat, possibly because prices were low and Danubian wheat had to compete on the import markets with abundant supplies from Argentina and North America. And the distinctly short wheat crop of 1924 did not preclude exports, though apparent domestic utilization was brought to a very low figure. In 1924–25 world wheat prices were high.

CHART 3.—TOTAL DOMESTIC UTILIZATION (CROP MINUS SEED MINUS EXPORTS) OF WHEAT IN THE DANUBE BASIN, PER CAPITA UTILIZATION, AND POPULATION, IN TERMS OF PERCENTAGE DEVIATIONS FROM THE 1922–23 TO 1926–27 AVERAGE, BY AUGUST–JULY CROP YEARS SINCE 1920–21*

(Percentages)



* Based on data in Appendix Table IX. The figures for 1929–30 are preliminary and are partially estimated with reference to net exports.

THE MILLING INDUSTRY

The difficulties faced by the milling industry in the Danube basin are numerous, and connected not only with domestic consumption of wheat but also with the problem of wheat and wheat flour exports. This relates especially to the Hungarian milling industry, which was always an export industry. Before the war, Hungary exported (principally to other parts of the Austro-Hungarian monarchy) more wheat flour than wheat. Budapest was the largest milling center of continental Europe. Flour produced here was consumed mostly within the limits of Austria-Hungary, and not much was exported into western European markets, even Germany. But in a sense the Austrian, Bohemian, and Polish markets were exterior markets from the Hungarian point of view, even though they were within the borders of the Austro-Hungarian monarchy.

Prior to 1890 the Hungarian milling industry was the milling center not only for wheat grown within pre-war Hungary, but in some degree for Roumanian wheat as well. Between 1882 and 1896 Hungarian flour mills were permitted to import wheat free of duty if they exported corresponding quantities of wheat flour (100 kgs. wheat to 70 kgs. flour). The identity of the wheat milled did not have to be proved. Hungarian flour mills used this privilege to import foreign wheat to mix with Hungarian wheat. But late in the 1880's a tariff war began between Austria-Hungary and Roumania, and importation of Roumanian wheat into Hungary was practically discontinued. In 1896 Hungarian mills lost their import privilege at about the same time most other countries of continental Europe began to apply protective tariffs for their own milling industries. As a result of these factors, the Hungarian mills lost most of their markets outside of the boundaries of the Austro-Hungarian monarchy. During the ten or fifteen years preceding the war, exports of Hungarian wheat flour into Great Britain, Germany, France, and Italy decreased by 80 or 90 per cent, but large quantities were still sold in all the Austro-Hungarian monarchy lying outside of proper Hungarian territory.

The Hungarian milling industry producing flour for export was concentrated in Budapest. Here large mills, twelve in number, existed, each of which milled three or four million bushels of wheat annually. They obtained their wheat from all the territory of pre-war Hungary principally by water routes. Much wheat was received from Banat and Backa, which now lie outside of the Hungarian boundaries.

In addition to Budapest there were several provincial milling centers, not so large but still of fair size; for example, in Debreczen, Nagyvarad, Arad, Temesvar, and Szeged on the Danubian plain east of the Tisza, and in Györ, west of Budapest on the small Danubian plain. Between Budapest's large flour mills and the provincial mills a certain division of trade was established; the Budapest mills worked principally for exports outside of Hungarian territory, while provincial mills worked rather for local markets. Even before the war there was perhaps an excessive capacity in the milling industry of Hungary. This excessive capacity became quite clear after the war, even though Hungary within her new frontiers lost part of her provincial milling centers: such considerable milling centers as Temesvar, Arad, and Nagyvarad are now within the limits of Roumania; many milling centers of Banat and Backa are in Jugo-Slavia; and several centers in Slovakia now lie within Czecho-Slovakia. But the Budapest Chamber of Commerce and Industry has estimated the milling capacity of post-war Hungary at 257 million bushels of grain,[1] while the country in 1923–27 produced less than 22 million barrels of wheat flour and about 8 million barrels of rye per year.

Perhaps this estimate is somewhat exaggerated, especially because it includes also small so-called "wage" mills (customs mills), which grind wheat for peasants but do not buy it,[2] but without doubt the milling industry of Hungary suffers from excessive producing capacity.

Even if we measure the milling capacity of Budapest mills by their actual production before the war, the excess capacity is large. In 1906, the twelve Budapest mills handled 31.2 million bushels of wheat. Since the war they milled about 6.6 million bushels in 1923, 8.1 million in 1925, and 6.6 million in 1926. This is on the average about 7 million bushels; that is, the Budapest mills now produce only around 20 to 25 per cent of what they produced in the pre-war years. There have recently been some adjustments. In 1927 the Budapest mills are said to have operated about 26–30 per cent of capacity, and in 1928 about 39 per cent.

The Budapest milling industry perhaps suffers now more than the provincial Hungarian milling industry. The Budapest industry continues to produce largely for the export market and was organized to mill the wheat of all Hungarian territory within the pre-war frontiers, while provincial mills are still based on local wheat. The provincial mills now compete with the Budapest flour mills even on the Budapest city market. Furthermore, the problem of export of Hungarian flour became more difficult after the war. Before the war Budapest mills had the whole Austro-Hungarian market protected for them by the Austro-Hungarian customs duties, and now the principal markets for Hungarian wheat in Austria, Czecho-Slovakia, and Poland are partially closed by the introduction of protective tariff policies designed to favor the milling industries of these countries.

These protective policies were particularly developed after 1926. The customs duties on flour in all these countries are high in comparison even with the high duties on grain. According to the new tariff law of Austria (1927), the autonomous duty on wheat flour is 12 gold crowns as against only 4 gold crowns on wheat. The tariff introduced by the Czecho-Slovakian government on July 14, 1926, established minimum duties for certain agricultural products, including flour, which cannot be modified even by means of commercial treaties. In the absence of a treaty, the duties are 140 Czech crowns on wheat; under a treaty, these duties are halved. To preserve her export, Hungary in 1927 concluded with Czecho-Slovakia a commercial (most favored nation) treaty, but the duty on flour remains 2½ times higher than that on wheat. As to Poland, on August 1, 1925, the government introduced an import duty of 9 zloty on flour, and on January 1, 1926, this was increased to 15 zloty, the import of wheat remaining duty-free. Later the import of flour was completely embargoed.

As a result of all these measures the export of Hungarian flour was greatly reduced. In all these importing countries, imports of wheat increased but imports of

[1] *Commerce and Industry of Hungary in the Year 1927* (Budapest, 1928), p. 101.

[2] Small mills which grind wheat for peasants are common throughout the wheat-producing regions of the Danube countries.

flour decreased. The following figures show Hungarian exports of wheat and flour to Austria and Czecho-Slovakia in million bushels during 1924–27.[1]

Year	To Austria		To Czecho-Slovakia	
	Wheat	Wheat flour	Wheat	Wheat flour
1924	2,374	4,624	2,903	5,711
1925	3,895	3,144	2,458	4,346
1926	6,720	4,309	4,181	2,220
1927	4,380	6,252	5,434	2,152

The figure of Hungarian exports to Austria in 1927 was high because, in view of the uncertainty in the tariff situation, Hungarian mills wishing to secure the advantage of the old tariff sent much flour for storage on commission to Austria.[2]

As compared with the three countries mentioned, other foreign markets for Hungarian flour have only a secondary importance. In 1927 the Hungarian flour exports to other markets composed only 9 per cent of the total flour export from Hungary.

Thus the Hungarian milling industry has suffered since the war from lack of trade, which gives rise to keen competition on the interior market and high overhead costs for the mills, all of which operate only a small part of their large capacity. Further, the industry suffers from the difficulty of marketing flour abroad because of the protective tariff policies of the neighboring countries, especially Czecho-Slovakia, Austria, and Poland.

The milling industries of the other Danube countries were not so firmly based on the export trade as the Hungarian milling industry. Nevertheless other countries, especially Roumania, also complain of the excessive capacity of their milling industries and of the difficulty of exporting flour. Just as the commercial policy of the countries separated from the old Austro-Hungarian monarchy has been detrimental to the Hungarian milling industry, so the Roumanian and Bulgarian milling interests complain of the policies of Turkey and Greece, which are the leading markets for Roumanian and Bulgarian flour. On the Egyptian market they suffer more from American and Australian competition than from the commercial policy of Egypt. Generally speaking, the technical development of the Roumanian and Bulgarian milling industries was not on so high a level as that of the Hungarian milling industry. For this reason alone, if Hungary has difficulty in getting her flour on markets other than the nearest ones, the problem is still more difficult for Roumania and Bulgaria.

The Roumanian milling industry has never been so strongly concentrated in one large center as the Hungarian. Roumanian grain export markets, especially Braila, had developed a milling industry which produced some flour for export. Other milling centers such as Bucharest worked rather for interior consumption. After the war Roumania acquired several new milling centers: from Hungary, Temesvar and Arad, and from Russia, Chisinau (formerly Kishenef) in Bessarabia.

The capacity of the larger commercial mills of Roumania is estimated at 110 million bushels of grain per year. There are more than 300 of these larger mills. Several of them have a daily producing capacity of from 9 to 13 thousand bushels. The capacity of the small, grist mills is difficult to estimate; certain authorities place it at 220 million bushels per year.[3] If this estimate is correct, then the milling capacity in Roumania also may be regarded as excessive. Indeed, the milling interests of Roumania complain that Bucharest flour mills operate only a third of their capacity. The Braila mills which operate mainly for the export trade are still less employed.

The milling industries in the Bulgarian grain export centers, Varna and Bourgas, are also insufficiently employed, and here also there are complaints about the difficulty of exportation.

Generally speaking, the milling industry of the whole Danube basin has been in an unsatisfactory condition since the war. In most regions it suffers from excessive producing capacity, especially the mills that concentrate on exports. The industry is not yet adjusted to the new political boundaries and to the new commercial policies of

[1] Data from Budapest Chamber of Commerce and Industry, *Report on the Commerce and Industry of Hungary in 1927*, p. 103.

[2] *Ibid.*, p. 103.

[3] See *Industria Morarilului* (Bucharest, 1928), p. 38. This pamphlet on the milling industry was published by the National Society of Industrial Credit.

newly created states. The difficulties of the largest milling center, Budapest, are so great that leaders in the industry have considered seriously the utilization of flour mills for other industrial purposes. During 1922–25 there existed a cartel among Budapest flour mills which distributed the orders among the different members. At the time only five of the Budapest mills were in operation; but since 1925 the cartel has been dissolved as a result of keen competition (evidently of provincial mills), and more than five mills have operated. The immediate outlook is not bright, for there are indications that in the importing countries which protect their milling industries, notably Czecho-Slovakia and Austria, there is a tendency to build new flour mills.

VII. WHEAT AND FLOUR EXPORTS

Volume and Importance

One of the outstanding characteristics of the Danubian wheat market before the war was the large fraction of wheat exported from the crops. Four Danubian countries in their pre-war frontiers—Bulgaria, Hungary, Roumania, and Serbia—produced annually on the average during 1909–10 to 1913–14 about 315 million bushels of wheat. With the average seed requirement a little more than 40 million bushels, there remained about 275 million bushels for interior consumption and for export. And of this quantity the four countries exported yearly during the same five years about 110 million bushels of wheat and flour as wheat. Thus 40 per cent of the wheat available was exported. The percentage of exports was especially high in Roumania, where out of 75.3 million bushels available, 53.4 million were exported, principally in the form of grain, or more than 70 per cent. Practically no other country in the world exported so large a percentage of its available supplies. Even such a new country as Argentina with its sparse population and enormous area of free land exported a smaller percentage of her available supplies than Roumania. She exported before the war some 63.7 per cent of her wheat free for disposition. Canada also exported a smaller percentage of her wheat than Roumania.

Such a seemingly abnormal relationship between production and exportation of wheat from Roumania as prevailed for a long period of time before the war may be explained by two facts. First, wheat was used as food by practically none of the rural population, for which corn was the principal food grain; and second, more than half of the wheat was produced on the large estates, which grew grain exclusively for sale, largely for export.

Other Danube countries could not export wheat so freely as Roumania because the rural population, particularly in Hungary and Bulgaria, was more accustomed to eat wheat than the Roumanian population. Again, the distribution of landed properties was more equal in Bulgaria and Serbia, and there was not such a preponderance of large estates as in Roumania. Small and medium farmers consumed a larger percentage of their wheat at home than did the large estates. The other Danube countries also had considerable wheat exports, comprising from 25 to 30 per cent of their wheat free for disposition. Hungary was able to export so large a percentage of her wheat, in spite of the fact that her own population was comparatively dense, because in Hungary as in Roumania large estates preponderated, and a large percentage of the agricultural population was in the position of agricultural laborers. This kept home consumption on a comparatively low level and made for heavy exports. The Hungarians consumed less bread grain (wheat and rye) than many of the European countries which import grain. To say nothing of such countries as France and Belgium, where wheat consumption is exceedingly heavy, even Italy and Spain had a larger per capita consumption of wheat (and of all bread grain) than Hungary. And at the same time the diet of the Hungarian population included relatively little meat.

Bulgaria and Serbia were able to export wheat extensively, even with a more equal distribution of landed properties, because the density of population in these countries was comparatively small, and, in addition, the Serbian population used much corn for

food. In Serbia as in Roumania corn was the principal human food. Such were the outstanding factors determining the volume of wheat exports from the Danube basin before the war.

After the war the situation changed radically. The absolute volume of exports and the importance of exports in relation to wheat production declined considerably. Even during the period 1923–24 to 1927–28, which may be regarded as more or less normal and which is five years distant from the end of the war, the exports of wheat and of flour were only about a third as large as the pre-war exports. From 110 million bushels during 1909–10 to 1913–14, the exports fell to 36 million bushels during the period 1923–24 to 1927–28. The relation of exports to wheat free for disposition decreased from about 40 per cent to about 16 per cent.

Roumania was chiefly responsible for this decrease in the absolute volume and in the relative importance of the Danubian wheat exports: from 53.4 million bushels of wheat and wheat flour in the pre-war period, her exports fell to only 8.2 million bushels in the post-war period, and from about 70 per cent of the wheat free for disposition to about 10 per cent. And between the two periods the territory of Roumania has been enlarged two and a half times.

Exports of wheat from the other Danube countries declined relatively less. It is difficult to compare the absolute volumes of exports because of the radically changed frontiers of the countries; but relatively, in comparison to the wheat free for disposition, the decline among these three countries as a group was from about 25 to 30 per cent of the total available for disposition before the war to about 20 per cent of the total available for disposition during the post-war period. Hungarian exports even increased relatively, from about 27 per cent to about 32 per cent, in spite of the fact that the non-agricultural population of pre-war Hungary was relatively more numerous than that of post-war Hungary.

Since the war Jugo-Slavia has exported a relatively smaller percentage of wheat than did pre-war Serbia, in spite of the fact that it includes the very rich surplus region of Banat and Backa; on the other hand, it also acquired wheat deficiency regions.

Exports of wheat from Bulgaria have decreased largely because she lost to Roumania her most important surplus wheat region, southern Dobrogea. Furthermore, a decline of wheat exports due to an increase in home consumption had begun in Bulgaria before the war.[1]

Although exports of wheat from all the Danube countries except Hungary have declined since the war, the principal problem is to explain the decline of Roumanian exports. As we have seen, the decline in Roumanian exports was caused principally by the decrease in wheat production, a little by increase of population. Changes in consumption habits could have influenced the Roumanian resources of wheat for export only a little. Fluctuation in wheat production was the principal cause of fluctuations in Roumanian wheat exports even before the war. Exports before the war fluctuated very widely, much more than those from the other Danube countries; for instance, from 27 and 33 million bushels in 1908 and 1909, they rose to more than 70 million bushels in 1910. Exports were closely correlated with production of wheat, and production of wheat in Roumania was less stable than in any of the other Danube countries. In addition, the fact that the new provinces of Roumania have always consumed larger percentages of their wheat production than Old Roumania also contributed somewhat to the decrease in the importance of Roumanian wheat exports in relation to Roumanian wheat production.

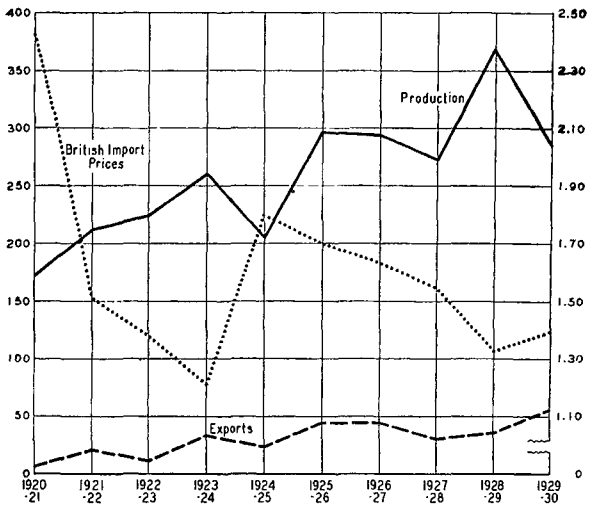
We have thus far considered principally the changes in the volume of Danubian wheat exports as between pre-war and post-war periods. From year to year, as in Roumania in pre-war years, the volume of exports from the basin as a whole has fluctuated appreciably in both periods. During the period 1905–13, the smallest net exports were made in the three years 1907, 1908, and 1909. These were also the years of shortest wheat crops. Thus there was in pre-war years a tendency for the net exports to vary directly with the size of the wheat crop. Nevertheless this tendency

[1] During the five years 1904–05 to 1908–09, Bulgaria exported nearly 47 per cent of her wheat free for disposition, but during the last five years before the war, only 30 per cent. Presumably the principal reason for this decrease was the Balkan wars preceding the great war.

was clearly modified by other influences, such as trend in domestic utilization, crops of other grains, and prices, though the available data do not justify precise conclusions. For post-war years, the data are somewhat more adequate. Chart 4 shows total net exports by crop years since 1920–21, in comparison with total wheat crops and with wheat prices in the United Kingdom.

CHART 4. — PRODUCTION AND NET EXPORTS OF WHEAT OF THE DANUBE BASIN, IN COMPARISON WITH BRITISH CUSTOMS PRICES, ANNUALLY FROM 1920–21*

(Million bushels; U.S. dollars per bushel)



* Data on production and net exports from Appendix Tables III and XII. The prices (for August–July crop years) are derived from official British statistics of quantities and values of wheat imported.

It is clear that exports, though correlated with size of crops, have not tended to increase as rapidly as wheat crops (or as wheat crops minus seed) in the post-war period, on account either of an increase in domestic consumption or of stocks, more probably the former. On account of this failure of net exports to increase as rapidly as crops, the tendency for exports to vary with crops is not striking. Nevertheless it is present in some degree, but is modified by other factors. Thus exports in 1924–25 were not much smaller than in 1923–24, though the crop of 1924 was far below that of 1923; the higher prices of 1924–25 seem to have stimulated exportation. The largest exports of the period (except possibly those of 1929–30, for which complete data are not yet available) were made in 1925–26 and 1926–27. These were years of good wheat crops, and of relatively good crops of corn; and wheat prices were fairly high. In 1927–28, the wheat crop, the corn crop, and wheat prices were lower than in the two preceding years; and exports of wheat were also smaller, though not strikingly so. The huge wheat crop of 1928 did not lead to heavy wheat exports, for the corn crop was short and wheat prices declined. Some of the wheat crop of 1928 was apparently carried over and utilized or exported in 1929–30; wheat exports during the first six months of 1929–30 have almost equaled those of any other post-war year, being stimulated by slightly higher prices of wheat and by a huge crop of corn. The extent to which the several factors affecting the volume of Danubian wheat exports operate in different years is not clear from the fragmentary data available. Probably the most favorable combination of circumstances is big crops both of wheat and of corn, and a relatively high level of international wheat prices. But this combination, or its converse, is perhaps unlikely to appear often; usually some factors tend to stimulate, others to retard the export movement. The outcome in a given year is always difficult to foresee, and often difficult to explain.

SOURCES OF EXPORTS

Before the war the principal source of the Danube wheat exports was Roumania, especially the Roumanian Danubian plain. This was due to the high ratio of wheat exports to the total production, and also to the high proportion of the total crop area which was sown to wheat on the Danubian plain. The Hungarian Danubian plain was the second important source of exports, and a more steady one because here yields did not fluctuate as much as in Roumania. The principal surplus regions in Hungary were the districts east of the Tisza within the borders of present Hungary, and the southeastern districts of Hungary, Banat and Backa, which now lie within the borders of Jugo-Slavia and partially in Roumania. However, other districts of Hungary, even its western districts, gave substantial surpluses for export, which moved toward the west. Since before the

war three-fifths to four-fifths of the Hungarian exports consisted of wheat flour exported principally from Budapest, wheat from the surplus areas moved first to Budapest, and was later exported thence in the form of flour.

The third important source of pre-war Danubian wheat exports was the Bulgarian tableland north of the Balkan ridge, especially the Bulgarian districts of Dobrogea, which became Roumanian after 1913.

With the decline in Roumanian wheat production and exports since the war, the most important source of the Danubian wheat exports became the Hungarian plain, which yielded during the post-war period about half of the total wheat exports from the Danube basin. These exports now consist more of wheat than of wheat flour. The surplus for export from Banat and Backa continues to be large, but this region is now the principal export region of Jugo-Slavia rather than Hungary. The Roumanian plain still continues to be the principal wheat export region of Roumania,[1] while the importance of the Bulgarian northern tableland as a wheat exporter declined considerably.

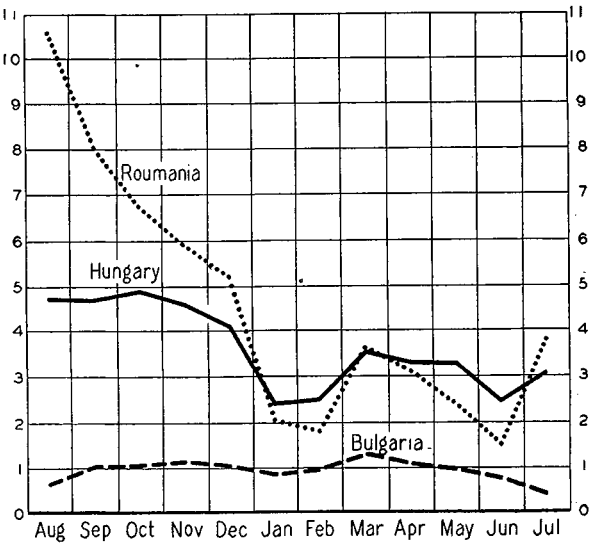
Seasonal Distribution of Exports

The Danube basin, the surplus wheat region nearest to the deficiency wheat countries of central and western Europe, can forward its wheat to the European importing markets earlier than can the other principal wheat-exporting regions of the Northern Hemisphere, except India. With the harvesting in the Danube basin beginning in the second half of June and in early July, exportation may be begun in July. Before the war Roumanian exports of wheat were in fact among the earlier ones. July showed a considerable seasonal increase in pre-war exports from Roumania, and August was the month of the heaviest exports. As is apparent from Chart 5, which shows the average monthly net exports from the Danubian countries during 1909–14, exports declined in subsequent months, reaching their lowest level in January and February, after the closing of navigation on the Danube in December.

A second considerably smaller peak occurred early in the spring (March–April) with the opening of navigation on the Danube. Before the war, 70 to 80 per cent of the crop year (July–June) exports had been made by the end of December.

Chart 5.—Pre-war Seasonal Movement of Danubian Wheat and Flour Exports*

(Million bushels)



* Data from Appendix Table XIII.

The seasonal distribution of Bulgarian exports was much more even, depending in a lesser degree on navigation on the Danube than did the Roumanian, because exports were directed more largely through the Black Sea ports. The distribution of Hungarian exports throughout the year was also more even than the Roumanian, largely because exports consisted more of wheat flour. However, they were more heavily concentrated in the first than in the second part of the crop year. Wheat from the surplus regions of Hungary was transported to Budapest principally during the fall by the Danube route, but wheat flour exports did not depend so much on navigation on the Danube but were directed in part to the deficiency regions of Austria by rail.

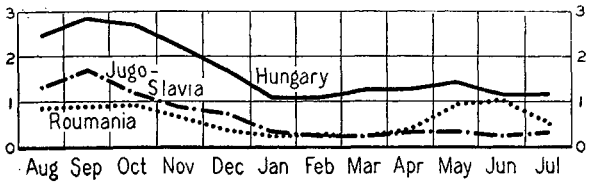
It is difficult to establish definitely the seasonal movement of Danubian exports

[1] Bessarabia, now a province of Roumania, was before the war a wheat surplus region of southern Russia; but its principal grain exports have always consisted more of barley and corn than of wheat.

since the war on account of abnormal conditions prevailing during several years. Chart 6 shows average monthly net exports from Hungary, Roumania, and Jugo-Slavia during the period 1924–25 to 1928–29. For these years at least, the seasonal character of the Roumanian export movement had become much less pronounced, though peaks still occurred in the fall and spring.

CHART 6.—POST-WAR SEASONAL MOVEMENT OF DANUBIAN WHEAT AND FLOUR EXPORTS*

(Million bushels)



* Data from Appendix Table XIII.

Perhaps the change is due merely to the greatly reduced total movement. Since Roumanian exports still depend on navigation on the Danube, it is possible that resumption of heavy exports would be accompanied by the pre-war seasonal movement. Hungarian exports became somewhat more heavily concentrated in the first half of the crop year than they were before the war, probably because since the war they have consisted more of wheat and less of wheat flour. The movement from Jugo-Slavia is also clearly of a pronounced seasonal character. Jugo-Slavian exports go mainly by the Danube route from Banat and Backa. The harvest of wheat in this region is earlier than in Hungary, and Jugo-Slavian exporters try to take advantage of the possibility of early marketing on the central European markets. With the closing of navigation on the Danube, Jugo-Slavian exports cannot profit by this more convenient route for exports, and have no good outlet. The months of heaviest exportation from Jugo-Slavia are August–October, when more than half of the total moves out each year.

Chart 7 (p. 266) is of some interest in its bearing on the seasonal movement of exports from the Danube basin in post-war years. The chart shows monthly average cash wheat prices (of wheat weighing 78 kilograms per hectoliter) at Budapest, in comparison with monthly average prices of all parcels of wheat sold in the United Kingdom. Interpretation must not be pressed far, not only because the price series are not in all respects satisfactory, but also because the United Kingdom is not regularly a market where Hungarian wheat is sold, and because prices on the markets where Hungarian wheat is sold (in Czecho-Slovakia, Germany, and Austria) cannot be expected to stand in the same relation to British prices from month to month and from year to year. Nevertheless the chart suggests that wheat prices in Budapest ordinarily stand further below international wheat prices in the earlier than in the later months of the crop year, thus favoring exportation in these earlier months.

EXPORT MARKETS

With respect to the direction taken by wheat exports, the countries of the Danube basin may be divided into two groups: (*a*) those exporting wheat principally by the maritime route, chiefly to western European but also to southern European markets; and (*b*) those employing chiefly the Danubian route to central European markets. Roumania and Bulgaria fall in the first group and, in years of large surplus, Jugo-Slavia as well; Hungary and in some years Jugo-Slavia belong to the second group. The export markets of the first group require attention because of changes which have occurred in the relative importance of the different western European markets.

Up to the middle of the decade 1880–90, the wheat exports of the lower Danube countries, particularly Roumania, were directed in considerable volume up the Danube toward the Austro-Hungarian markets. Hungarian mills then were able to use much Roumanian wheat. But when the tariff war was begun between Austria-Hungary and Roumania, all Roumanian exports of wheat were forwarded by the maritime route, and England became the principal market. England was the principal market for Roumanian wheat from about 1880 to 1895. Thereafter the importance of the English market decreased, whereas the importance of the Belgian market increased, to become the principal market for Roumanian wheat and to keep that posi-

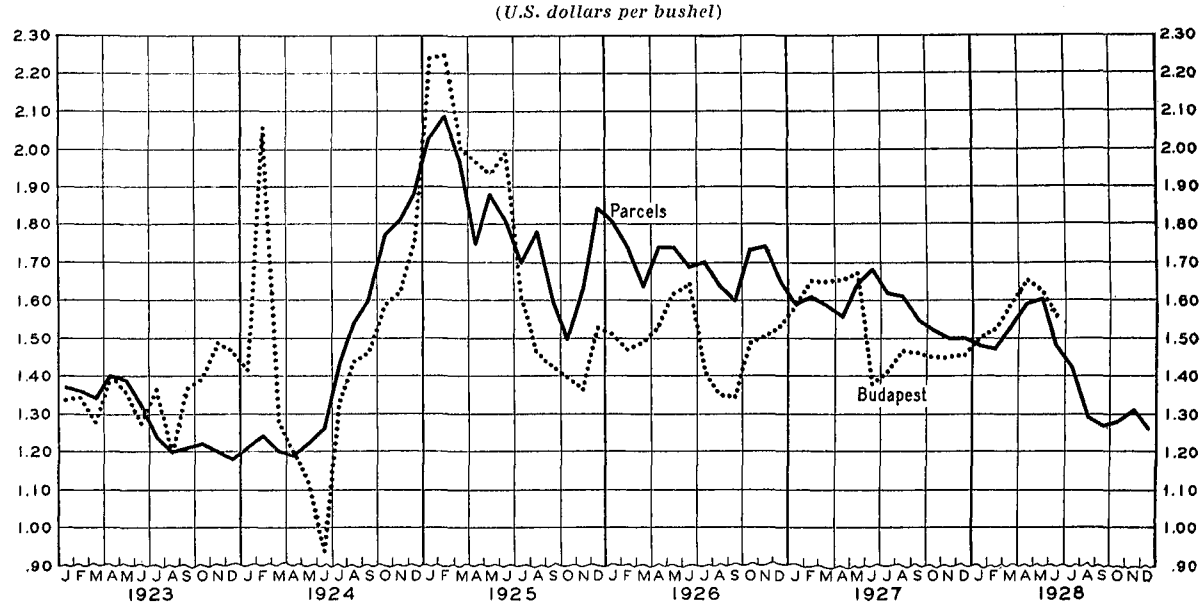
tion until the war. During the ten years preceding the war the importance of the Italian and Dutch markets increased also. The Dutch and Belgian markets were not only the markets of final destination of Roumanian wheat, but also the transit markets for further transportation of wheat into Germany and France.

tition from North and South America and from Russia.

From this point of view Hungary was in quite a different position. Her principal, nearly her only, export market was within the limits of the Austro-Hungarian monarchy. We have seen that Hungary practically lost the western European markets

CHART 7.—COMPARISON OF MONTHLY AVERAGE WHEAT PRICES IN BUDAPEST AND ON THE BRITISH IMPORT MARKET, FROM JANUARY 1923*

(*U.S. dollars per bushel*)



* Budapest prices from Appendix Table XIV; British parcels prices compiled by the Food Research Institute from sales of parcels reported in the *London Grain, Seed and Oil Reporter* (see WHEAT STUDIES, July 1928, IV, No. 8). The extremely erratic fluctuations in Budapest prices late in 1923 and early in 1924 in part reflect the wide fluctuations in the Hungarian foreign exchange.

The destination of Bulgarian exports changed in much the same way. Before the war Belgium also was her principal market, and second in importance was England, which yielded first place to Belgium around the beginning of the present century. There were, however, certain differences between the destinations of Roumanian and Bulgarian exports; the neighboring markets of Greece and Turkey were of relatively larger importance for Bulgaria than for Roumania. The common characteristics of exports from both countries were the great importance of the Antwerp market during the ten years preceding the war, and the maritime route followed by exports. Both Roumania and Bulgaria, on the most important export markets for their wheat, were exposed to direct compe-

for its wheat flour; and this was even more true of the Hungarian wheat exports. Practically no wheat exports passed from Hungary outside of the Austro-Hungarian borders. Austria in its pre-war frontiers was the only market for Hungarian wheat, and this market was protected by the Austro-Hungarian common customs duties. Hence Hungary, unlike the lower Danube countries, was not compelled to meet competition in western European markets on an equal basis.

After the war conditions changed radically, particularly for Hungary. She continues to export her wheat within the same geographical regions as before the war, but these regions have become parts of independent states and their tariff policies are now directed not in favor of Hungary but

against her. Hence arise the difficulties in Hungarian exportation of wheat flour mentioned above. As the result, wheat is now exported in the form of grain, while before the war it was exported more in the form of flour. Hungary now occupies the same competitive position as her neighbors on the old Austrian markets, and is now obliged to seek out markets for her wheat and wheat flour in other European countries. The importance for Hungary of such markets as Switzerland, Germany, and Italy has increased. But even in 1925–28 the exports of Hungarian wheat grain to countries other than those which composed former Austria were less than 15 per cent of the total wheat grain exports from Hungary, and less than 10 per cent of her total flour exports went to these countries.

The export markets for the wheat exported from the lower Danube—from Roumania and Bulgaria—remain the same as before the war. Belgium is still the principal export market for Roumanian wheat. England, France, Netherlands, Germany, and other western European markets are also important. Roumania also exports a little wheat up the Danube to Austria, Czecho-Slovakia, and Hungary. It is difficult to say which of these markets will eventually prove most important for Roumania, because actual post-war exports have been comparatively small and widely dispersed among many countries.

Bulgarian exports of wheat have decreased considerably and are directed principally to the neighboring markets of Greece and Turkey. However, the importance of the Turkish market has declined considerably during recent years, since 1924, with recovery in Turkish wheat production and the introduction of high duties on flour. Exports of wheat from Bulgaria to the western European markets have the character of incidental exports.

Perhaps the least established of all are the export markets for Jugo-Slavian wheat. Before the war Serbian wheat exports moved partly up and partly down the Danube; a good deal was exported to the Austro-Hungarian markets, but a good deal also was exported through the Roumanian ports to such markets as Belgium. Wheat from Banat and Backa was directed mainly through Budapest. Jugo-Slavian wheat is now sent in great part to the Austrian and Czecho-Slovakian markets, though sometimes it goes also to Hungary, presumably to be worked up by the Hungarian milling industry. But large exports of Jugo-Slavian wheat are also sent to the Roumanian markets or through these markets to western Europe; the precise destinations are difficult to establish from the statistics of Jugo-Slavian international trade. Exports to western Europe via the lower Danube probably occur in large volume only in years of good crops.

Generally speaking, Jugo-Slavia is so situated that her exports may be directed with equal facility either up or down the Danube in accordance with market conditions. As a result of this the export markets for Jugo-Slavian wheat change from year to year in accord with crop conditions in the Danube basin and in central Europe. The close relationship between the wheat exports from Banat and Backa and the Budapest milling industry, which existed before the war, no longer seems to exist, at any rate not in such a degree as before. This is a reflection of the new political conditions and new state boundaries.

In conclusion it may be said that export markets for Danubian wheat have not become definitely established since the war. Roumanian exports were abnormally low for several years; the commercial policies of central European countries have been changing, and political factors still continue to influence trade relations greatly. With such conditions still prevailing, the adjustment of exports to the new situation cannot be regarded as definitely fixed.

VIII. THE OUTLOOK FOR THE FUTURE

The principal questions requiring examination in order to obtain a reasonably well-founded appraisal of the outlook for future developments in production and export of wheat from the Danube basin are these. What are the prospects for increase or decrease in the acreage under crops and under wheat especially in the Danube basin? Is it reasonable to anticipate any considerable increase in the yield per acre of

wheat? Finally, what tendencies may be expected to appear in the domestic consumption of wheat as the result of increase in population or a shift in the diet from another food grain, such as corn, to wheat? Discussion of these questions can hardly be conclusive, yet it may give a semblance of a basis for adjudging possible developments in the export of wheat from the Danube region.

Potential Expansion of Acreage

A considerable increase of acreage of plow land in the Danube basin cannot reasonably be anticipated. The competition between crops and livestock for land, notably between crop land and pasture and meadow land, had already proceeded so far even before the war that in some regions, for example Old Roumania, the postwar agrarian reforms had as one of their chief purposes to provide the peasantry with pasture land because they had transformed too much pasture into crop land. In Hungary, in northern Jugo-Slavia (Voivodina and eastern Croatia-Slavonia), and in Bessarabia the percentage of plow land is now so high (from 60 to 70 per cent) that in these regions further evolution in that direction is impossible. A comparatively large amount of pasture and of unproductive land is still to be found in Jugo-Slavia in the mountainous regions, and particularly in the Karstland region in the southwest. But it is doubtful if much of this pasture land can be turned into crop land; and it is still more doubtful if this can occur with respect to the unproductive land. A similar situation exists in Bulgaria, as is witnessed by the fact that the attempts of the Bulgarian peasant government to expropriate land from the vast state domains during agrarian reform, in order to increase the landed property of the landless peasantry, failed to give practical results because the state lands were not suitable for agriculture. In Roumania, however, some transfer of unproductive land to productive may be expected through drainage of land flooded by the Danube. On the lower reaches of the Danube, where the river after passing the Iron Gate spreads out on the Roumanian plain, there is a considerable area of such lands, particularly in the Danubian delta. These lands can be utilized if embankments are built along the Danube, and they may be used successfully for crops on account of the facility with which they could be irrigated with the Danubian water, a procedure perhaps advantageous on account of the rather dry climate characteristic of the region. By means of similar reclamation of flooded land on the Danubian plain within the borders of present Hungary and Jugo-Slavia, agriculture gained, in the nineteenth century, about 8 million acres of excellent land. The problem of reclamation is now being considered in Roumania. But even if a policy of reclamation should be stressed, it could increase the arable area of Roumania only slowly. In general it is difficult to foresee any considerable increase in the total area of arable land in the Danube basin.

The acreage under crops may be increased somewhat by better utilization of the actual area of arable lands through decreasing the area in fallow. This possibility exists in some regions of the Danube basin, namely in Bulgaria and southern Jugo-Slavia, where fallow composes a considerable percentage of total arable area. The tendency in the direction of decreasing the area of fallow is already clearly pronounced. However, the areas where fallow is common are not extensive in the Danube basin, as we have seen.

In any event increase of the crop area does not necessarily imply increase of the cereal area and particularly of the wheat area. The tendency to reduce the area in fallow is accompanied by the process of diversification and intensification of farming in the same regions; land transferred from fallow is utilized more often for forage, legumes, or special cultures than for cereals. Another factor which may exert its influence in the direction of decreasing rather than of increasing the area under wheat is the competition of corn. We have seen that since the war and the agrarian reform, the wheat acreage in Roumania has not recovered to its pre-war level, whereas the acreage in corn has increased considerably. The increase in the relative importance of corn acreage since the war is notable also in Hungary. It is possible that the general increase in the proportion of arable land lying within small holdings will cause

such a shift to corn to continue, because small peasants in general prefer to sow corn, the more intensive crop, on their lands.

All these considerations hardly permit us to expect any considerable increase in the arable area in general and in the area of wheat in particular. It is more reasonable to expect that wheat acreage will remain fairly close to the level prevailing in 1925–27.

Possibility of Increase in Yield

The problem of increasing the yield per acre has two aspects: recovery to the level of pre-war yield, and increase beyond this level. We have seen that in all the Danube countries, and especially in Roumania, the yield per acre of wheat in the post-war period 1923–27 was lower than it was before the war. Although the other Danube countries have nearly recovered their pre-war yields, Roumania remains far below this. The outstanding problem in the recovery of pre-war yield is the matter of adjustment of peasant farmers to the new conditions prevailing after the war and to the agrarian reform. The major difficulties in improving peasant farming are shortage of capital and credit, and lack of education. Both of these difficulties are hard to solve. The problem of capital and credit is connected with the general financial situation of the Danube countries. In several respects stabilization of the financial situation has recently become apparent. Since 1928 all four countries have approached actual stabilization of their monetary systems. Roumania and Bulgaria have at last succeeded in obtaining a certain amount of foreign credit, and both countries are utilizing a considerable part of this credit for the purpose of developing agricultural and co-operative credit. The policy of the new Roumanian peasant government is thus directed. If the condition of agricultural credit can be improved, it is reasonable to expect that peasants will be better supplied with agricultural implements and other requirements for better cultivation, and hence that a closer approach to the pre-war level of yield per acre of wheat may occur.

In the direction of the development of agricultural (and general) education of the rural population, all of the Danube states make considerable effort. Increase in the number of agricultural schools and courses, and of demonstration farms and the like, is characteristic of them all. But the process of raising the general level of education can at best proceed only slowly, and it is unreasonable to expect any sudden change. Thus even the attainment of pre-war yields is a comparatively difficult problem in Roumania, for here it is necessary that peasants obtain such yields as were obtained before the war on large estates, whose managers were far better equipped with implements and education than the mass of peasants can be expected to be for a long time to come.

As to further increase of yield per acre above the pre-war level, it is not reasonable to expect any marked increase, for instance up to the level of yields obtained in the western European countries, because of the less favorable climate in the Danube basin. Increase in the use of fertilizer, and further intensification of farming, cannot possibly give such results as have been obtained in such countries as Germany and Belgium, where the rainfall is much greater. But improvement and selection of seed wheat may have appreciable effects, and all Danubian countries have begun energetic work in this direction.

For the near future, at least, it is not reasonable to anticipate an increase of the yield of wheat per acre in the Danube basin to a level higher than that secured before the war in Hungary. This level may be regarded as a suitable goal for such countries as Roumania and Bulgaria, and is not to be obtained without effort. Of the more distant future it is unnecessary to speak further than to point out that, so long as the annual rainfall in the Danube basin remains what it has been, agriculture is hardly likely to become so intensive in character or to achieve such high yields as in the more humid parts of western Europe.

Possible Tendencies in Domestic Consumption of Wheat

As we have seen, the high ratio of the export of wheat to production characteristic of some Danubian countries in pre-war years was possible largely because the rural population consumed much corn as

food, and sometimes other grains than wheat. Hence any shift in the diet of the population from corn to wheat may cause a considerable decrease in the export surplus even if production should remain stable or should increase a little. We found it impossible to detect any radical change in the diet of the population between the pre-war and post-war years, though a slight tendency toward the substitution of wheat for corn was observed, and in the post-war period taken alone the trend in per capita wheat consumption was upward. Since consumption of corn as human food is characteristic of the rural population, each shift of the population from the country to the city will mean an increase in the consumption of wheat and a decrease in the consumption of corn, at least for human food. And the tendency toward increase in the urban population relative to the rural is inevitable in the Danube countries. The process of industrialization of these countries is just beginning. Since the war it has developed considerably, and the present policies of all Danubian governments are directed to that goal. Such countries as Roumania and Jugo-Slavia have considerable natural resources still undeveloped, and these augur industrialization to a considerably higher degree than now prevails. Industrialization of the Danubian countries, accompanied by an increase of urban population relative to the rural, would considerably decrease the exportable wheat surplus, because shifts from corn consumption to wheat consumption would be involved.

If, on the contrary, the process of industrialization should not advance, then it is reasonable to expect early over-population of the country, because the increasing rural population would have no outlet from agriculture. Further overcrowding of the rural districts would entail a further crisis in agriculture, which may be perceived even now in some regions. Further subdivision of the existing small peasant plots would involve decreasing productivity in agriculture, and decreased exports of wheat might well follow. The problem of population growth and distribution in the Danube basin is very real because, except in Hungary, the population probably increases rapidly, at a rate of well over 1 per cent per year.

Consideration of these factors bearing on possible exports of wheat from the Danube basin leads us to conclude that some increase of exports may occur through recovery of yield per acre in the regions where it is now considerably below the prewar level, at least if other factors do not intervene. But no considerable or continuous increase of exports can be anticipated. More probably there will be a gradual decline of exports as a result of increasing domestic consumption. It is unreasonable to expect that Roumania should export so high a percentage of her wheat production as she exported before the war. But under favorable conditions Roumania could at least for a time increase her exports considerably if the yield recovered with some rapidity, because even now a large proportion of the Roumanian population does not consume wheat as food, and dietary habits change slowly. In short, the outlook for exports is obscure because one cannot anticipate whether recovery of yield is likely to advance more rapidly than population growth and shift to industrialization, with concomitant increase of domestic consumption of wheat. But all these forces may be expected to act slowly, and in the next few years exports are likely to depend, as they have done recently, upon weather conditions causing fluctuations in domestic crop production, and somewhat upon changing levels of world prices.

This study is the work of Vladimir P. Timoshenko, with several suggestions of M. K. Bennett, especially in Sections VI and VII, and with the co-operation of the staff of the Food Research Institute. It is based not only upon documentary source material, but also upon observations made by the author in travel throughout the Danube countries during the summer of 1928.

APPENDIX

TABLE I.—LAND UTILIZATION IN THE DANUBE BASIN, WITH SPECIAL REFERENCE TO AREAS SOWN TO CEREALS, AVERAGE 1925–27*

(Thousand acres and percentages)

Item	Four countries		Hungary		Jugo-Slavia		Roumania		Bulgaria	
	(Thousand acres)	*(Per-centage)*	*(Thousand acres)*	*(Per-centage)*	*(Thousand acres)*	*(Per-centage)*	*(Thousand acres)*	*(Per-centage)*	*(Thousand acres)*	*(Per-centage)*
Total area	182,731	100.0	22,971	100.0	61,403	100.0	72,868	100.0	25,489	100.0
Agricultural area	.....	.....	18,827[a]	82.0	27,965	45.5	42,220	57.9	.....	.....
Non-agricultural area	.....	.....	4,144	18.0	33,438	54.5	30,648	42.1	.....	.....
Agricultural area..	.....	.....	18,827[a]	100.0	27,965	100.0	42,220	100.0	.....	.....
Arable area.....	67,795	.....	13,608	72.3	15,266	54.6	30,470	72.2	8,451[b]	.....
Non-arable area.	.....	.....	5,219	27.7	12,699	45.4	11,750	27.8	.....	.....
Arable area.....	67,795	100.0	13,608	100.0	15,266	100.0	30,470	100.0	8,451[b]	100.0
Fallow	4,262	6.3	657	4.8	823	5.4	1,030	3.4	1,752[b]	20.7[c]
Sown	63,533	93.7	12,951	95.2	14,443	94.6	29,440	96.6	6,699[b]	79.3
Area sown.....	63,533	100.0	12,951	100.0	14,443	100.0	29,440	100.0	6,699[b]	100.0
Wheat	18,912	29.7	3,796	29.3	4,495	31.1	8,014	27.2	2,607	38.9
Corn	19,743	31.1	2,666	20.6	5,434	37.6	10,057	34.2	1,586	23.7
Barley	6,651	10.5	1,035	8.0	931	6.4	4,134	14.0	551	8.2
Oats	4,698	7.4	689	5.3	917	6.4	2,758	9.4	334	5.0
Rye	3,376	5.3	1,703	13.2	516	3.6	697	2.4	460	6.9
Other cereals...	813	1.3	30	.2	267	1.9	217	.7	299	4.5
Non-cereal crops	9,340	14.7	3,032	23.4	1,883	13.0	3,563	12.1	862	12.8
Total cereal area..	54,193	100.0	9,919	100.0	12,560	100.0	25,877	100.0	5,837	100.0
Wheat	18,912	34.9	3,796	38.3	4,495	35.8	8,014	31.0	2,607	44.7
Corn	19,743	36.4	2,666	26.9	5,434	43.3	10,057	38.9	1,586	27.2
Oats	6,651	12.3	1,035	10.4	931	7.4	4,134	16.0	551	9.4
Barley	4,698	8.7	689	6.9	917	7.3	2,758	10.6	334	5.7
Rye	3,376	6.2	1,703	17.2	516	4.1	697	2.7	460	7.9
Other cereals...	813	1.5	30	.3	267	2.1	217	.8	299	5.1

* Data from official statistics of the designated countries. Dots (....) indicate that data are not available or cannot be computed accurately.

[a] Data for 1925 only.

[b] Data for 1925 and 1926.

[c] Land in fallow in Bulgaria constituted 36.8 per cent of the arable area in 1897, and 21.3 per cent in 1911.

TABLE II.—LAND UTILIZATION IN THE DANUBE COUNTRIES BY DISTRICTS, WITH SPECIAL REFERENCE TO THE AREA IN WHEAT, AVERAGE 1925–27*

(Thousand acres and percentages)

Country and district	Total area	Arable area	Cereal area	Winter-wheat area	Spring-wheat area	Total wheat area	Percentage of total wheat area to		
							Total area	Arable area	Cereal area
Hungary	22,972	13,679	9,874	3,748.3	49.9	3,798.2	16.5	27.8	38.5
Trans-Danubian Region	9,094	5,128	3,577	1,250.0	14.1	1,264.1	13.9	24.6	35.2
Baranya	993	576	414	175.9	2.2	178.1	17.9	31.0	43.0
Fejér	1,020	678	482	140.7	0.8	141.5	13.9	20.9	29.4
Györ	594	376	260	75.1	0.8	75.9	12.8	20.2	29.2
Komáron	490	266	176	50.9	0.5	51.4	10.5	19.3	29.2
Somogy	1,654	889	617	221.7	2.7	224.4	13.6	25.2	36.4
Sopron	476	284	178	72.4	1.2	73.6	15.5	25.9	41.3
Tolna	876	572	416	156.2	2.2	158.4	18.1	27.7	38.0
Vas	811	481	328	123.1	1.5	124.6	15.4	25.9	38.0
Veszprém	979	525	358	102.3	1.0	103.3	10.6	19.7	28.9
Zala	1,201	481	348	131.7	1.2	132.9	11.1	27.6	38.1
Danubian and Tisza Plain	10,421	6,824	5,092	1,944.2	21.2	1,965.4	18.9	28.8	38.6
Bács-Bodrog	434	288	234	80.3	1.5	81.8	18.8	28.4	34.9
Békés	910	713	596	293.0	3.0	296.0	32.5	41.5	49.7
Bihar	685	462	338	153.1	1.9	155.0	22.6	33.5	45.8
Csanád	495	412	331	160.9	1.7	162.6	32.8	39.5	49.1
Csongrád	856	569	477	175.6	0.9	176.5	20.6	31.0	37.0
Hajdu	826	469	386	183.9	0.6	184.5	22.3	39.4	47.9
Jasz-Nagykún-Szolnok	1,300	958	743	400.7	1.9	402.6	31.0	42.0	54.2
Pest-Pilis-Solt-Kiskun	3,252	1,713	1,282	271.3	4.5	275.8	8.5	16.1	21.5
Szabolcs	1,132	860	489	139.4	2.0	141.4	12.5	16.5	28.9
Szatmár	531	380	216	86.0	3.2	89.2	16.8	23.4	41.2
Northern Hilly Region	3,457	1,727	1,205	554.1	14.6	568.7	16.5	33.0	47.2
Abauj-Torna	412	204	137	60.5	1.5	62.0	15.1	30.5	45.1
Borsod	980	462	329	159.9	4.4	164.3	16.8	35.5	50.0
Heves	927	489	353	179.9	2.0	181.9	19.6	37.2	51.4
Nógrád	702	349	226	86.4	4.2	90.6	12.9	26.0	40.2
Zemplén	436	223	160	67.4	2.5	69.9	16.0	31.4	43.7
Jugo-Slavia	61,411	15,266	12,561	4,323.6	164.5	4,488.1	7.3	29.4	35.7
Bačka	1,773	1,280	1,101	468.5	5.9	474.4	26.8	37.1	43.1
Belgrade	2,391	1,718	1,586	730.2	8.2	738.4	30.9	43.0	46.5
Bitolj	2,958	393	294	113.4	6.2	119.6	4.0	30.4	40.7
Bihac	1,384	356	321	52.4	10.9	63.3	4.6	17.8	19.7
Bregalnica	1,225	122	83	28.4	1.0	29.4	2.4	24.1	35.5
Valjevo	607	208	196	86.5	1.7	88.2	14.5	42.4	45.1
Vranje	1,450	257	224	69.4	5.0	74.4	5.1	29.0	33.2
Vrbas	2,228	727	499	127.5	13.8	141.3	6.3	19.4	28.3
Dubrovnik	552	41	18	6.2	....	6.2	1.1	15.1	35.2
Zagreb	1,975	661	486	86.7	1.2	87.9	4.5	13.3	18.1
Zeta	3,293	160	146	29.9	3.2	33.1	1.0	20.7	22.7
Kosovo	2,093	327	308	114.7	2.7	117.4	5.6	35.9	38.1
Kruševac	670	124	111	20.0	1.2	21.2	3.2	17.1	19.1
Lubljana	2,272	355	201	65.4	2.9	68.3	3.0	19.2	34.0
Maribor	1,836	441	331	91.7	2.5	94.2	5.1	21.3	28.4
Morava	716	227	209	48.5	2.0	50.5	7.1	22.3	24.2
Mostar	2,258	172	121	20.3	5.4	25.7	1.1	15.0	21.3
Niš	1,796	430	387	104.0	7.2	111.2	6.2	25.9	28.7
Osijek	3,308	1,342	1,045	472.6	2.4	475.0	14.4	35.4	45.5
Podrinje	877	305	286	137.4	3.5	140.9	16.1	46.2	49.3

* Acreage data from official statistics of the designated countries. Some minor adjustments have been made to make the items and totals agree. Dots (....) indicate that data are not available.

TABLE II.—LAND UTILIZATION IN THE DANUBE COUNTRIES—*Continued.*

(Thousand acres and percentages)

Country and district	Total area	Arable area	Cereal area	Winter-wheat area	Spring-wheat area	Total wheat area	Percentage of total wheat area to		
							Total area	Arable area	Cereal area
Jugo-Slavia (*Continued*)									
Podunavlje	1,524	870	821	363.6	2.9	366.5	24.0	42.1	44.6
Požarevac	1,032	373	351	99.3	4.5	103.8	10.1	27.8	29.6
Primorsko-Kraiška	3,532	699	511	99.6	14.6	114.2	3.2	16.3	22.3
Raška	2,084	205	190	36.6	5.7	42.3	2.0	20.6	22.2
Sarajevo	2,077	257	186	25.2	7.7	32.9	1.6	12.8	17.7
Skoplje	2,187	286	241	77.2	5.9	83.1	3.8	29.1	34.5
Split	2,513	301	253	57.6	1.7	59.3	2.4	19.7	23.5
Srem	1,697	934	760	311.8	2.2	314.0	18.5	33.6	41.3
Timok	1,577	343	308	111.4	10.4	121.8	7.7	35.5	39.5
Travnik	2,500	302	219	35.3	5.2	40.5	1.6	13.4	18.5
Tuzla	2,204	615	385	112.9	8.4	121.3	5.5	19.7	31.5
Užice	1,867	149	124	20.3	5.9	26.2	1.4	17.6	21.1
Šumadia	955	286	259	99.1	2.5	101.6	10.6	35.5	39.2
Roumania[a]	74,081	30,499	25,877	7,280.5	728.9	8,009.4	10.8	26.3	31.0
Group I	6,693	3,636	3,192	503.0	32.4	535.4	8.0	14.7	16.8
Dorohoi	725	441	404	49.1	7.8	56.9	7.8	12.9	14.1
Botosani	769	378	332	55.8	3.0	58.8	7.6	15.6	17.7
Jassy	932	465	399	60.5	8.2	68.7	7.4	14.8	17.2
Roman	474	255	201	33.8	1.0	34.8	7.4	13.7	17.6
Vaslui	545	276	241	52.2	1.7	53.9	9.9	19.5	22.4
Fălciu	552	307	263	36.3	3.2	39.5	7.2	12.9	15.0
Tutova	630	353	300	44.2	3.0	47.2	7.5	13.4	15.7
Covurlui	644	392	355	57.4	1.8	59.2	9.2	15.1	16.7
Tecuci	599	376	332	47.2	2.2	49.4	8.2	13.1	14.9
Râmnicu-Sărat	823	393	365	66.5	.5	67.0	8.1	17.0	18.4
Group II	3,761	746	615	76.8	7.2	84.0	2.2	11.3	13.7
Fălticeni	791	213	160	19.8	3.3	23.1	2.9	10.9	14.5
Neamtu	1,057	157	128	15.3	1.5	16.8	1.6	10.7	13.1
Bacău	1,087	208	191	25.0	1.0	26.0	2.4	12.5	13.6
Putna	826	168	136	16.7	1.4	18.1	2.2	10.7	13.3
Group III	8,519	2,345	2,159	571.3	15.3	586.6	6.9	25.0	27.2
Buzău	1,192	542	506	106.0	2.5	108.5	9.1	20.0	21.4
Prahova	1,158	277	225	58.3	.3	58.6	5.1	21.2	26.1
Dâmbovita	853	310	268	47.7	....	47.7	5.6	15.4	17.8
Muscel	777	41	36	.5	....	.5	.1	1.2	1.4
Arges	1,059	334	313	75.1	1.2	76.3	7.2	22.8	24.4
Vâlcea	1,020	157	152	26.4	3.5	29.9	2.9	19.0	19.7
Gorj	1,140	161	151	25.5	2.2	27.7	2.4	17.2	18.3
Mehedinti	1,320	523	508	229.3	5.7	235.0	17.8	45.0	46.3
Group IV	9,478	6,307	5,780	2,248.7	3.8	2,252.5	23.8	35.7	39.0
Dolj	1,563	1,111	1,059	515.5	1.0	516.5	33.0	46.5	48.8
Romanati	880	653	633	342.8	.6	343.4	39.0	52.6	54.3
Olt	698	455	440	190.3	.7	191.0	27.4	42.0	43.4
Teleorman	1,102	802	745	406.2	....	406.2	36.9	50.7	54.6
Vlasca	1,097	727	667	284.9	.7	285.6	26.0	39.3	42.8
Ilfov	1,246	766	635	238.8	.6	239.4	19.2	31.3	37.7
Jalomita	1,832	1,136	977	212.0	....	212.0	11.6	18.7	21.7
Braila	1,060	657	624	58.2	.2	58.4	5.5	8.9	9.4
Group V	5,704	2,778	2,256	446.6	84.4	531.0	9.3	19.1	23.5
Tulcea	2,113	593	506	38.3	37.1	75.4	3.6	12.7	14.9
Constanza	1,702	1,027	882	111.3	14.9	126.2	7.4	12.3	14.3
Durostor	739	396	297	99.3	.3	99.6	13.5	25.1	33.6
Caliacra	1,150	762	571	197.7	32.1	229.8	20.0	30.2	40.3

[a] These figures do not exactly show the areas within the designated districts. Official statistics show changes in the total area of some districts between 1926 and 1927, apparently representing administrative changes in the boundaries of districts. Here we have arranged the official data as given for 1925, 1926, and 1927.

TABLE II.—LAND UTILIZATION IN THE DANUBE COUNTRIES—*Concluded.*

(Thousand acres and percentages)

Country and district	Total area	Arable area	Cereal area	Winter-wheat area	Spring-wheat area	Total wheat area	Percentage of total wheat area to		
							Total area	Arable area	Cereal area
Roumania (*Continued*)									
Transylvania	26,511	7,240	5,637	2,104.4	171.8	2,276.2	8.6	31.4	40.4
Alba	896	267	232	84.3	12.8	97.1	10.8	36.4	41.9
Arad	1,504	688	629	287.4	4.7	292.1	19.4	42.5	46.5
Bihor	1,951	673	566	249.8	4.5	254.3	13.0	37.8	44.9
Brasov	458	92	57	7.4	4.7	12.1	2.6	13.1	21.2
Caras	1,187	445	394	164.6	5.2	169.8	6.2	38.2	43.1
Severin	2,742								
Ciuc	1,197	145	77	6.4	3.5	9.9	0.8	6.8	12.9
Cluj	1,242	305	237	73.7	24.5	98.2	7.9	32.3	41.5
Făgăras	585	153	92	24.8	.3	25.1	4.3	16.4	27.4
Huniedoara	1,928	298	235	80.0	15.1	95.1	4.9	31.9	40.5
Moramures	891	59	37	.5	.5	1.0	0.1	1.7	2.7
Mures	1,076	284	215	62.6	7.0	69.6	6.5	24.5	32.3
Năsăud	1,070	159	96	23.0	3.7	26.7	2.5	16.8	27.7
Odorhei	728	185	120	42.0	2.7	44.7	6.1	24.2	37.3
Sălaj	955	422	286	106.5	12.6	119.1	12.5	28.2	41.7
Satu-Mare	1,163	436	273	81.3	5.9	87.2	7.5	20.0	32.0
Sibiu	889	191	135	55.2	2.1	57.3	6.4	30.1	42.4
Somes	1,106	298	201	49.7	5.9	55.6	5.0	18.6	27.6
Târnave-Mare	814	208	140	47.7	.5	48.2	5.9	23.2	34.4
Târnava-Mică	516	241	168	49.9	.5	50.4	9.8	20.9	30.1
Timis-Torontal	1,822	1,225	1,109	530.3	16.5	546.8	30.0	44.6	49.3
Trei-Scaune	933	227	144	22.5	11.4	33.9	3.6	14.9	23.6
Turda	858	239	194	54.8	27.2	82.0	9.6	34.4	42.2
Bessarabia	10,784	6,726	5,795	1,281.6	396.0	1,677.6	15.6	24.9	28.9
Bălti	1,250	994	790	213.2	28.7	241.9	19.4	24.3	30.6
Cahul	1,109	579	523	44.7	63.0	107.7	9.7	18.6	20.6
Cetatea-Albă	1,935	1,310	1,262	295.5	91.2	386.7	20.0	29.5	30.6
Lăpusna	1,063	522	460	85.0	42.0	127.0	11.9	24.3	27.6
Hotin	890	682	530	105.8	25.2	131.0	14.7	19.2	24.7
Ismail	987	624	595	90.7	56.8	147.5	14.9	23.6	24.8
Orhei	1,026	617	447	146.7	15.2	161.9	15.8	26.2	36.2
Soroca	1,036	621	448	145.8	15.1	160.9	15.5	25.9	35.9
Tighina	1,488	778	740	154.2	58.8	213.0	14.3	27.4	28.8
Bucovina	2,631	721	443	48.1	18.0	66.1	2.5	9.2	14.9
Bulgaria[a]	25,488	8,450	5,780	2,535.4	46.5	2,581.9	10.1	30.6	44.7
Bourgas	3,365	1,072	667	345.4	18.3	363.7	10.8	33.9	54.6
Varna	941	388	264	164.5	0.2	164.7	17.5	42.4	62.4
Vidin	1,047	526	451	222.6	1.5	224.1	21.4	42.6	49.7
Vratza	1,704	642	579	258.5	1.0	259.5	15.2	40.4	44.8
Kustendil	981	306	162	23.0	1.5	24.5	2.5	8.0	15.1
Mastanly	975	146	100	27.7	1.0	28.7	2.9	19.7	28.7
Pachmakly	683	35	19	1.5	1.0	2.5	0.4	7.1	13.0
Pétritch	1,680	158	88	15.8	1.5	17.3	1.0	10.9	19.8
Plovdiv	2,448	726	418	159.1	1.5	160.6	6.6	22.1	38.4
Pléven	1,887	695	545	237.2	0.5	237.7	12.6	34.2	43.6
Roussé	1,219	617	387	155.7	....	155.7	12.8	25.2	40.3
Sofia	2,283	564	349	26.9	4.9	31.8	1.4	5.6	9.1
St. Zagora	1,640	711	526	289.3	6.7	296.0	18.0	41.6	56.2
Tirnovo	1,927	766	515	241.4	0.8	242.2	12.6	31.6	47.0
Haskovo	1,227	466	307	129.7	5.7	135.4	11.0	29.1	44.1
Choumen	1,481	632	403	237.1	0.4	237.5	16.0	37.6	58.9

[a] Except for total area, the data for Bulgaria as a whole and by districts are two-year averages, 1925 and 1926.

TABLE III.—ACREAGE, YIELD PER ACRE, AND PRODUCTION OF WHEAT IN THE DANUBE COUNTRIES, 1905–29*

(Thousand acres, bushels per acre, and million bushels)

Year	Acreage (Thousand acres)				Yield per acre (Bushels)				Production (Million bushels)			
	Hungary	Jugo-Slavia[a]	Roumania	Bulgaria	Hungary	Jugo-Slavia[a]	Roumania	Bulgaria	Hungary	Jugo-Slavia[a]	Roumania	Bulgaria
	Territory within pre-war boundaries											
1905	9,197	919	4,838	2,422	18.5	12.3	21.7	14.4	170.59	11.26	104.76	34.95
1906	9,521	922	4,999	2,496	21.8	14.3	22.5	15.7	207.76	13.21	112.29	39.11
1907	8,777	909	4,235	2,414	14.9	9.2	10.1	9.8	130.68	8.37	42.80	23.54
1908	9,474	939	4,453	2,422	17.5	12.2	12.5	15.1	165.42	11.49	55.52	36.49
1909	8,799	922	4,174	2,570	14.2	17.5	14.1	12.5	125.01	16.14	58.87	32.07
1910	9,375	954	4,814	2,691	19.3	13.4	23.0	15.7	181.13	12.78	110.82	42.25
1911	9,163	954	4,769	2,763	20.7	16.1	20.1	17.5	190.08	15.32	95.66	48.30
1912	9,575	.....	5,113	2,886	19.3	....	17.5	15.5	184.64	.....	89.41	44.76
1913	8,532	.....	4,010	2,469	19.6	....	21.0	17.6	167.35	.....	84.19	43.50
1914	8,861	.....	5,219	2,525	13.3	....	8.9	9.2	117.78	.....	46.30	23.20
1915	8,204	.....	4,705	2,404	18.5	....	19.1	14.8	151.40	.....	89.79	35.53
1916	.....	.....	4,843	2,382	....	....	16.2	12.4	.....	.....	78.52	29.60
1917	.....	.....	.....	2,481	....	....	....	11.7	.....	.....	.....	29.07[b]
1918	.....	.....	5,683	2,434	....	....	3.8	9.5	.....	.....	21.46	23.20[b]
	Territory within post-war boundaries											
Average 1909–13[c]	3,712	3,982	9,515[d]	2,409	19.3	15.6	16.7[d]	15.7	71.49	62.02	158.67[d]	37.82
1919	.....	.....	4,270	2,056	....	....	15.5	14.5	.....	.....	66.02	29.78[b]
1920	2,661	3,561	4,999	2,175	14.3	12.1	12.3	13.7	37.93	43.01	61.31	29.89
1921	2,889	3,699	6,148	2,234	18.2	14.0	12.8	13.1	52.72	51.81	78.56	29.24
1922	3,524	3,672	6,548	2,301	15.5	12.1	14.1	14.2	54.73	44.47	92.00	32.57
1923	3,294	3,842	6,647	2,382	20.6	15.9	15.4	12.2	67.71	61.07	102.12	29.13
1924	3,499	4,243	7,838	2,491	14.7	13.6	9.0	9.9	51.57	57.77	70.42	24.70
1925	3,524	4,307	8,157	2,545	20.3	18.3	12.8	16.3	71.67	78.64	104.74	41.36
1926	3,753	4,443	8,221	2,617	20.0	16.1	13.5	14.0	74.91	71.42	110.88	36.54
1927	4,045	4,631	7,663	2,673[e]	19.0	12.2	12.6	15.8[e]	76.93	56.57	96.73	42.12[e]
1928	4,140	4,747	7,923	2,779	24.0	21.8	14.6	18.2	99.21	103.29	115.54	50.69
1929[f]	3,571	5,289	6,764	2,617	20.1	18.0	12.5	13.2	71.83	94.98	84.51	34.46

* Acreage and production data for 1905–25 from International Institute of Agriculture *Yearbooks;* for 1926 and 1927 from official statistics of the designated countries; for 1928 and 1929 from U.S. Department of Agriculture. Yield per acre data computed by Food Research Institute. The figures include both spring and winter wheat, but spring wheat is of little importance. Dots (....) indicate that data are not available.

[a] Serbia in pre-war period.

[b] In the official publication, *Statistique agricole de Bulgarie, 1926,* data as follows are given on Bulgarian wheat production, in million bushels: 1917, 25.07; 1918, 19.76; 1919, 29.64.

[c] Estimates of U.S. Department of Agriculture.

[d] Four-year average.

[e] Data from U.S. Department of Agriculture.

[f] Preliminary.

TABLE IV.—ACREAGE, YIELD PER ACRE, AND PRODUCTION OF CORN (MAIZE) IN THE DANUBE COUNTRIES, AVERAGE 1909–13 AND ANNUALLY 1919–29*

(Thousand acres, bushels per acre, and million bushels)

Year	Acreage (Thousand acres)				Yield per acre (Bushels)				Production (Million bushels)			
	Hungary	Jugo-Slavia	Roumania	Bulgaria	Hungary	Jugo-Slavia	Roumania	Bulgaria	Hungary	Jugo-Slavia	Roumania	Bulgaria
1909–13	2,192	4,786	9,644[a]	1,492	27.7	23.4	20.0[a]	17.6	60.81	111.90	193.21[a]	26.28
1919	.....	.....	6,751	1,446	....	....	20.9	17.6	.....	.....	141.35	25.46
1920	2,016	4,485	8,142	1,394	24.9	22.6	22.4	14.8	50.16	101.14	182.33	20.69
1921	2,167	4,646	8,510	1,421	14.6	15.9	13.0	11.5	31.70	73.79	110.64	16.38
1922	2,444	4,722	8,411	1,401	19.9	19.0	14.2	11.7	48.73	89.80	119.77	16.37
1923	2,402	4,453	8,411	1,381	20.5	19.0	18.0	15.8	49.25	84.78	151.40	21.78
1924	2,459	4,856	8,948	1,505	30.1	30.8	17.4	16.4	74.12	149.40	155.46	24.75
1925	2,654	5,221	9,714	1,581	33.1	28.6	16.9	16.3	87.97	149.23	163.74	25.83
1926	2,676	5,372	10,030	1,515	28.6	25.0	23.9	18.0	76.54	134.25	239.49	27.31
1927	2,646	5,624	10,425	1,661	25.8	14.8	13.3	12.4	68.35	83.01	139.09	20.61
1928	2,623	5,693	11,010	1,601	18.9	12.6	9.9	12.7	49.59	71.61	108.51	20.27
1929[b]	2,713	5,915	11,849	1,928	28.2	27.2	15.8	18.7	76.61	160.74	187.00	36.07

* Acreage and production data for 1919–25 from International Institute of Agriculture *Yearbooks;* 1909–13 averages are as calculated by U.S. Department of Agriculture; 1926 and 1927 data from official statistics of the designated countries; 1928 and 1929 data from U.S. Department of Agriculture and International Institute of Agriculture. All data are for territory within post-war boundaries. Dots (....) indicate that data are not available.

[a] Four-year average.
[b] Preliminary.

TABLE V.—ACREAGE, YIELD PER ACRE, AND PRODUCTION OF BARLEY IN THE DANUBE COUNTRIES, AVERAGE 1909–13 AND ANNUALLY 1919–29*

(Thousand acres, bushels per acre, and million bushels)

Year	Acreage (Thousand acres)				Yield per acre (Bushels)				Production (Million bushels)			
	Hungary	Jugo-Slavia	Roumania	Bulgaria	Hungary	Jugo-Slavia	Roumania	Bulgaria	Hungary	Jugo-Slavia	Roumania	Bulgaria
1909–13	1,322	1,058	3,378[a]	516	24.5	19.1	18.3[a]	20.1	32.37	20.23	61.68[a]	10.38
1919	.....	.....	1,942	484	....	....	16.3	9.7	.....	.....	31.64	4.68
1920	1,265	927	3,459	549	17.1	14.2	19.5	17.1	21.67	13.20	67.61	9.38
1921	1,184	909	3,877	524	18.1	14.7	11.7	16.2	21.41	13.38	45.25	8.49
1922	1,144	927	4,267	549	19.4	11.9	22.0	18.7	22.17	11.07	93.78	10.28
1923	1,124	892	4,641	546	24.3	15.8	13.1	15.4	27.27	14.06	60.87	8.43
1924	1,008	899	4,574	529	14.6	15.0	6.7	13.4	14.71	13.48	30.76	7.07
1925	1,018	885	4,211	544	25.0	20.5	11.1	22.2	25.43	18.15	46.82	12.06
1926	1,063	907	3,835	551	24.0	19.0	20.2	20.1	25.51	17.27	77.39	11.08
1927	1,008	986	4,356	554	23.5	14.7	13.3	25.3	23.69	14.45	57.95	14.04
1928	1,020	974	4,322	605	30.1	18.6	16.1	24.8	30.67	18.11	69.40	15.00
1929[b]	1,134	1,103	5,074	551	26.0	17.2	24.8	22.1	29.46	18.92	125.71	12.15

* For sources see note to Appendix Table IV.

[a] Four-year average.
[b] Preliminary.

TABLE VI.—ACREAGE, YIELD PER ACRE, AND PRODUCTION OF OATS IN THE DANUBE COUNTRIES, AVERAGE 1909–13 AND ANNUALLY, 1919–29*

(Thousand acres, bushels per acre, and million bushels)

Year	Acreage (Thousand acres)				Yield per acre (Bushels)				Production (Million bushels)			
	Hungary	Jugo-Slavia	Roumania	Bulgaria	Hungary	Jugo-Slavia	Roumania	Bulgaria	Hungary	Jugo-Slavia	Roumania	Bulgaria
1909–13.....	849	1,358	2,119[a]	408	33.5	24.7	28.2[a]	21.2	28.46	33.52	59.78[a]	8.65
1919.....	...	.....	951	284	....	....	24.0	20.4	.....	.....	22.82	5.79
1920.....	803	1,028	2,387	339	27.8	21.6	28.6	20.3	22.31	22.24	68.35	6.88
1921.....	885	1,003	3,062	331	24.8	18.8	21.7	20.1	21.96	18.90	66.36	6.66
1922.....	810	966	3,296	366	27.9	18.9	27.9	21.0	22.56	18.27	92.08	7.70
1923.....	803	927	3,324	378	34.2	23.2	18.9	18.7	27.46	21.47	62.67	7.08
1924.....	709	872	3,057	376	22.2	23.8	13.7	16.9	15.71	20.79	42.01	6.37
1925.....	717	848	2,928	356	35.6	28.0	17.4	21.6	25.53	23.77	50.99	7.69
1926.....	689	917	2,664	321	36.0	26.9	30.0	20.9	24.80	24.64	79.85	6.72
1927.....	645	966	2,679	321	34.9	20.8	22.3	23.3	22.51	20.12	59.81	7.48
1928.....	652	943	2,759	298	42.2	26.8	24.5	20.6	27.53	25.24	67.55	6.14
1929[b].....	718	980	2,997	379	36.4	24.7	31.2	30.9	26.10	24.17	93.65	11.70

[*] For sources see Appendix Table IV.
[a] Four-year average.
[b] Preliminary.

TABLE VII.—ACREAGE, YIELD PER ACRE, AND PRODUCTION OF RYE IN THE DANUBE COUNTRIES, AVERAGE 1909–13 AND ANNUALLY, 1919–29*

(Thousand acres, bushels per acre, and million bushels)

Year	Acreage (Thousand acres)				Yield per acre (Bushels)				Production (Million bushels)			
	Hungary	Jugo-Slavia	Roumania	Bulgaria	Hungary	Jugo-Slavia	Roumania	Bulgaria	Hungary	Jugo-Slavia	Roumania	Bulgaria
1909–13.....	1,608	732	1,286[a]	542	19.5	12.3	16.1[a]	15.4	31.38	9.00	20.64[a]	8.34
1919.....	.....	...	749	455	....	....	13.4	13.5	.....	....	10.05	6.14
1920.....	1,475	489	781	457	13.7	12.5	12.1	13.5	20.25	6.09	9.44	6.19
1921.....	1,342	462	808	467	17.3	12.6	11.2	13.0	23.15	5.81	9.08	6.09
1922.....	1,663	487	660	455	15.1	9.3	13.9	14.0	25.15	4.52	9.20	6.39
1923.....	1,614	462	667	423	19.4	12.8	14.4	12.3	31.27	5.91	9.61	5.22
1924.....	1,638	482	670	413	13.5	11.5	8.9	10.4	22.10	5.54	5.96	4.30
1925.....	1,700	492	667	455	19.1	16.0	12.0	15.7	32.53	7.87	8.00	7.15
1926.....	1,747	521	729	460	18.0	14.3	15.4	15.5	31.42	7.45	11.24	7.13
1927.....	1,653	529	694	462	13.4	11.2	13.4	17.8	22.17	5.92	9.32	8.24
1928.....	1,608	503	731	487	20.3	15.0	15.7	18.9	32.59	7.53	11.48	9.22
1929[b].....	1,605	600	766	525	20.6	13.8	17.1	16.3	32.99	8.27	13.08	8.54

[*] For sources see Appendix Table IV.
[a] Four-year average.
[b] Preliminary.

TABLE VIII.—LIVESTOCK IN THE DANUBE BASIN, PRE-WAR AND POST-WAR*

(Thousands)

Country and type of livestock	Pre-war[a]	1921	1922	1923	1924	1925	1926	1927	1928[b]	Numbers in 1925 per 1,000 acres total area	Numbers in 1925 per 1,000 acres agricultural area	Numbers in 1925 per 1,000 acres arable area	Numbers in 1925 per 1,000 inhabitants
Four countries													
Horses	.....	.....	.....	.....	.....	.....	.....	.....	.....	....	....	....	....
Cattle[c]	15,001	14,010[d]	.....	.....	.....	12,859	.....	.....	.....	430	776	1,176	299
Swine	11,086	9,450[d]	.....	.....	.....	9,142	.....	.....	.....	306	551	838	209
Sheep	32,581	25,976[d]	.....	.....	.....	30,860	.....	31,611	.....	1,030	1,861	2,824	706
Hungary													
Horses	*896*[e]	.....	717	*815*	*850*	*876*	*885*	903	.....	232	284	393	105
Cattle	*2,150*[e]	.....	1,828	*1,819*	*1,896*	*1,920*	1,847[f]	1,805[f]	1,812	509	625	862	231
Swine	*3,322*[e]	.....	2,473	*2,133*	*2,458*	*2,633*	*2,520*	*2,387*	2,662	699	855	1,184	317
Sheep	*2,406*[e]	.....	1,352	*1,587*	*1,814*	*1,891*	*1,804*	*1,611*	1,566	502	615	848	228
Jugo-Slavia													
Horses[g]	.....	*1,069*	1,044	1,063	1,054	1,106	1,117	1,120	.....	111	242	455	87
Cattle[c]	5,155	*5,011*	4,090	3,902	3,813	3,796	3,738	3,760	.....	376	833	1,564	298
Swine[h]	3,956	*3,373*	2,887	2,497[i]	2,516	2,802	2,806	2,770	.....	277	613	1,154	220
Sheep	10,496	*7,011*	8,462	7,639	7,619	7,907	7,933	7,736	.....	781	1,730	3,257	622
Roumania													
Horses	.....	.....	1,687	1,802	1,828	1,845	1,815	1,877	1,939	156	267	371	107
Cattle[c]	5,648	4,876	5,721	5,932	5,739	5,583	5,219	4,992	.....	450	806	1,132	324
Swine	3,262	2,514	3,160	3,147	2,925	3,133	3,088	3,168	3,076	262	452	633	182
Sheep	11,128	8,690	11,195	12,321	12,481	13,612	12,950	13,582	12,941	1,139	1,967	2,755	791
Bulgaria													
Horses	*478*[j]	*398*	.....	.....	.....	.....	.....	.....	.....	....	....	....	....
Cattle[c]	2,048[j]	*2,295*	.....	.....	.....	1,560	.....	.....	.....	373	771	1,134	290
Swine	546[j]	*1,090*	.....	.....	.....	574	.....	.....	.....	138	284	418	107
Sheep	8,551[j]	*8,923*	.....	.....	.....	7,450	.....	8,682	.....	1,787	3,682	5,414	1,387

* Data of the U.S. Department of Agriculture, controlled by official statistical publications of the respective countries, and *International Yearbooks of Agricultural Statistics*. Hungarian data as of April, and Jugo-Slavian as of January in designated years; Roumanian and Bulgarian data as of December of the preceding year. Census data appear in italics. Dots (....) indicate that data are not available or cannot be computed.

[a] Data for last year preceding the war, and for post-war boundaries, except as noted.
[b] Preliminary. [c] Including buffaloes. [d] Using Hungarian data for 1922. [e] Data for 1911.
[f] U.S. Department of Agriculture data. The International Institute of Agriculture gives 1,839 for 1926 and 1,709 for 1927.
[g] Horses employed in agriculture. [h] Swine on farms.
[i] The International Institute of Agriculture gives 2,797. [j] Data for 1910, for pre-war boundaries.

TABLE IX.—TOTAL AND PER CAPITA DISAPPEARANCE OF WHEAT IN THE DANUBE BASIN, ANNUALLY FROM 1920–21*

(Million bushels, million people, and bushels per capita)

Country and Item	1920–21	1921–22	1922–23	1923–24	1924–25	1925–26	1926–27	1927–28	1928–29	1929–30
Hungary										
Crop	37.9	52.7	54.7	67.7	51.6	71.7	74.9	76.9	99.2	71.8
Net export	....[a]	9.4	5.2	16.8	13.5	19.8	21.9	21.8	26.0	30.0[b]
Seed	7.5	9.2	8.5	9.1	9.2	9.6	10.4	10.8	9.3	9.0[b]
Total disappearance	30.4	34.1	41.0	41.8	28.9	42.3	42.6	44.3	63.9	32.8
Population	7.9	8.0	8.1	8.2	8.3	8.4	8.4	8.5	8.6	8.7
Per capita disappearance	3.82	4.25	5.05	5.10	3.48	5.05	5.04	5.19	7.41	3.77
Jugo-Slavia										
Crop	43.0	51.8	44.5	61.1	57.8	78.6	71.4	56.6	103.3	95.0
Net export	3.7	3.9	1.0	5.9	9.6	10.8	9.7	.6	8.8	22.0[b]
Seed	8.8	8.7	9.2	10.1	10.3	9.9	10.7	11.3	12.6	11.5[b]
Total disappearance	30.5	39.2	34.3	45.1	37.9	57.9	51.0	44.7	81.9	61.5
Population	12.0	12.2	12.3	12.5	12.6	12.7	12.8	12.9	12.9	13.0
Per capita disappearance	2.54	3.22	2.78	3.62	3.01	4.56	3.98	3.47	6.34	4.73
Roumania										
Crop	61.3	78.5	92.0	102.1	70.4	104.7	110.9	96.7	115.5	84.5
Net export	1.4	3.5	1.6	9.0	3.2	9.9	11.2	7.5	1.6	3.0[b]
Seed	16.5	17.5	17.8	21.0	21.8	22.0	20.5	21.2	18.1	19.0[b]
Total disappearance	43.4	57.5	72.6	72.1	45.4	72.8	79.2	68.0	95.8	62.5
Population	16.0	16.3	16.5	16.7	17.0	17.2	17.5	17.7	18.0	18.2
Per capita disappearance	2.71	3.54	4.40	4.31	2.67	4.23	4.53	3.84	5.34	3.43
Bulgaria										
Crop	29.9	29.2	32.6	29.1	24.7	41.4	36.5	42.1	50.7	34.5
Net export	1.8	4.5	4.3	2.5	(1.7)[c]	4.4	2.2	2.0	.8[b]	0.0[b]
Seed	7.5	7.7	8.0	8.3	8.5	8.8	9.0	9.3	8.8	8.5[b]
Total disappearance	20.6	17.0	20.3	18.3	17.9	28.2	25.3	30.8	41.1	26.0
Population	4.9	5.0	5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8
Per capita disappearance	4.25	3.43	4.01	3.54	3.39	5.25	4.62	5.50	7.51	4.48
Four countries										
Crop	172.1	212.2	223.8	260.0	204.5	296.4	293.7	272.3	368.7	285.8
Net export	6.9	21.3	12.1	34.2	24.6	44.9	45.0	31.9	37.2	55.0[b]
Seed	40.3	43.1	43.5	48.5	49.8	50.3	50.6	52.6	48.8	48.0[b]
Total disappearance	124.9	147.8	168.2	177.3	130.1	201.2	198.1	187.8	282.7	182.8
Population	40.8	41.5	42.0	42.6	43.2	43.7	44.2	44.7	45.2	45.7
Per capita disappearance	3.06	3.57	4.00	4.17	3.02	4.61	4.48	4.20	6.26	4.00

* Production and trade data of U.S. Department of Agriculture and International Institute of Agriculture. Population figures in part from official sources, in part through *International Yearbooks of Agricultural Statistics*, adjusted to give consistent trends. Seed calculated from the following requirements per acre: for Hungary, 2.60 bushels; Jugo-Slavia, 2.38; Roumania, 2.68; and Bulgaria, 3.35.

[a] Net import of 6,000 bushels. [b] Estimated. [c] Net import.

TABLE X.—NET EXPORTS OF CEREALS FROM THE DANUBE COUNTRIES BY CALENDAR YEARS, 1908–12 AND 1920–28*

(Million bushels)

	1908	1909	1910	1911	1912	1920	1921	1922	1923	1924	1925	1926	1927	1928
Hungary														
Wheat[a]	47.57	22.42	37.59	50.30	55.80	(.72)[b]	5.89	5.98	10.79	17.42	17.54	22.55	19.60	20.76
Rye[c]	8.21	8.25	11.43	12.54	11.87	.00	1.43	2.60	2.58	7.23	1.98	9.18	5.91	5.23
Corn	15.10	14.08	16.02	18.33	(2.62)[b]	.01	1.09	(.22)[b]	(.08)[b]	1.21	6.82	5.57	.59	1.21
Barley	13.48	12.38	11.08	10.81	12.35	(.01)[b]	.18	.04	.01	.58	1.78	2.19	2.42	1.31
Oats	11.25	15.14	11.01	10.91	13.00	.08	.80	.65	3.50	1.52	2.11	3.09	1.79	.55
Jugo-Slavia[d]														
Wheat[a]	3.60	4.43	3.20	3.73	3.87	2.95	3.26	1.31	4.60	8.20	4.64	12.55	2.98	5.46
Rye	.18	.26	.22	.29	.14	.02	.06	.04	.00	.19	.12	.44	.25	.01
Corn	1.93	3.74	6.69	4.63	1.87	4.97	12.89	(.60)[b]	3.80	9.59	39.69	35.18	7.54	(1.57)[b]
Barley	1.42	2.81	1.41	.90	.70	.29[e]	1.12[e]	.18[e]	.10[e]	1.07[e]	.83[e]	1.28[e]	.72	(.23)[b]
Oats	.11	.60	.66	.34	(.06)[b]	.09	.71[f]	(.61)[bf]	(.21)[bf]	.08[f]	.49[f]	.27[f]	.47	.25
Roumania														
Wheat[a]	27.44	32.99	70.16	57.46	54.74	(.01)[b]	3.80	2.12	2.55	10.52	.57	15.50	11.19	2.34
Rye[c]	1.77	2.22	5.29	5.08	2.44	1.56	2.33	1.21	.41	1.23	.02	1.03	2.41	....
Corn	28.79	28.92	23.34	60.92	42.28	16.90	30.28	11.91	26.69	29.34	22.81	27.15	69.53	....
Barley	6.46	13.11	17.81	21.71	10.80	19.33	17.78	26.45	37.47	12.68	8.39	26.68	32.30	....
Oats	3.89	12.06	11.85	16.05	1.87	2.65	11.40	16.05	12.12	6.34	1.42	4.21	6.15	....
Bulgaria														
Wheat[a]	9.11	7.43	11.36	14.64	11.53	.67	3.28	4.88	3.51	.55	.81	3.62	2.22	1.15
Rye[c]	1.56	1.08	2.19	2.83	2.03	.02	.33	.41	.34	.06	.02	.50	.78	.95
Corn	4.29	4.89	4.71	13.95	11.36	4.18	2.20	2.22	4.18	8.31	4.58	3.88	5.08	1.87
Barley	1.72	1.34	2.75	3.46	.82	.47	.79	1.33	.65	.57	.93	1.06	3.57	1.69
Oats	.45	.84	.08	.47	.12	.00	.04	.36	.15	.01	.00	.00	.01	.02
Four countries														
Wheat[a]	87.72	67.27	122.31	126.13	125.94	2.89	16.23	14.29	21.45	36.69	23.56	54.22	35.99	29.71
Rye[c]	11.72	11.81	19.13	20.74	16.48	1.60	4.15	4.26	3.33	8.71	2.14	11.15	9.35	....
Corn	50.11	51.63	50.76	97.83	52.89	26.06	46.46	13.31	34.59	48.45	73.90	71.78	82.74	....
Barley	23.08	29.64	33.05	36.88	24.67	20.08	19.87	28.00	38.23	14.90	11.93	31.21	39.01	....
Oats	15.70	28.64	23.60	27.77	14.93	2.82	12.95	16.45	15.56	7.95	4.02	7.57	8.42	....

* Data from *International Yearbooks of Agricultural Statistics*. Except for Hungary, pre-war data are on the Julian calendar. Dots (....) indicate that data are not available.

[a] Includes flour as wheat, converted on the basis of 70 per cent.
[b] Net import.
[c] In post-war years includes flour as rye, converted on the basis of 70 per cent.
[d] Serbia in pre-war years.
[e] Gross exports.
[f] Barley included in import data.

TABLE XI.—INTERNATIONAL TRADE OF THE DANUBIAN COUNTRIES IN WHEAT AND FLOUR, BY CALENDAR YEARS, 1905–14 AND 1920–28*

(Million bushels)

Calendar year	Hungary							Jugo-Slavia[a]						
	Wheat		Flour		Wheat net exports	Flour net exports	Total net exports	Wheat		Flour		Wheat net exports	Flour net exports	Total net exports
	Exports	Imports	Exports	Imports				Exports	Imports	Exports	Imports			
1905.....	17.72	2.80	.....	...	14.92	.....	.....	3.42	.00	.10	.03	3.42	.07	3.49
1906.....	23.44	1.24	38.92	.25	22.20	38.67	60.87	3.37	.00	...	...	3.37	...	....
1907.....	20.92	.30	38.69	.49	20.62	38.20	58.82	1.99	.01	...	...	1.98	...	....
1908.....	15.87	.60	32.59	.29	15.27	32.30	47.57	3.32	.00	.29	.01	3.32	.28	3.60
1909.....	9.23	17.96	31.67	.52	(8.73)[b]	31.15	22.42	4.19	.00	.25	.01	4.19	.24	4.43
1910.....	13.27	6.12	30.97	.53	7.15	30.44	37.59	2.67	.00	.53	.00	2.67	.53	3.20
1911.....	17.28	2.19	35.68	.47	15.09	35.21	50.30	3.37	.00	.37	.01	3.37	.36	3.73
1912.....	17.01	.68	39.80	.33	16.33	39.47	55.80	3.53	.02	.37	.01	3.51	.36	3.87
1913.....	18.43	.46	38.16	.43	17.97	37.73	55.70	....	...	...	...	....	...	....
1914.....	5.67[c]	6.00[c]	15.35[c]	.44[c]	(.33)[b,c]	14.91[c]	14.58[c]	....	...	...	...	....	...	....
1920.....	.01	.06	.07	.74	(.05)[b]	(.67)[b]	(.72)[b]	1.53	.01[d]	1.43	.00	1.52	1.43	2.95
1921.....	.65	.00	5.24	.00	.65	5.24	5.89	1.73	.03[d]	1.57	.01	1.70	1.56	3.26
1922.....	12	.19	6.05	.00	(.07)[b]	6.05	5.98	.90	.22[d]	1.19	.56	.68	.63	1.31
1923.....	2.76	.03	8.06	.00	2.73	8.06	10.79	3.54	.08[d]	2.01	.87	3.46	1.14	4.60
1924.....	6.63	.54	11.34	.01	6.09	11.33	17.42	6.33	.10[d]	3.10	1.13	6.23	1.97	8.20
1925.....	8.01	.52	10.05	.00	7.49	10.05	17.54	6.24	.88[d]	1.98	2.70	5.36	(.72)[b]	4.64
1926.....	14.83	.00	7.72	.00	14.83	7.72	22.55	10.92	.03[d]	1.72	.06	10.89	1.66	12.55
1927.....	11.44	.00	8.16	.00	11.44	8.16	19.60	2.35	.02	.66	.01	2.33	.65	2.98
1928.....	10.45	.00	10.31	.00	10.45	10.31	20.76	5.96	.25	.10	.35	5.71	(.25)[b]	5.46
	Roumania							Bulgaria						
1905.....	63.07	.20	2.26	.00	62.87	2.26	65.13	16.54	.01	1.00	.00	16.53	1.00	17.53
1906.....	63.48	.48	3.48	.00	63.00	3.48	66.48	9.86	.02	1.22	.00	9.84	1.22	11.06
1907.....	42.31	.04	2.60	.00	42.27	2.60	44.87	8.85	.10	1.37	.00	8.75	1.37	10.12
1908.....	26.25	.16	1.35	.00	26.09	1.35	27.44	7.82	.05	1.34	.00	7.77	1.34	9.11
1909.....	31.51	.12	1.60	.00	31.39	1.60	32.99	5.91	.11	1.63	.00	5.80	1.63	7.43
1910.....	67.66	.31	2.81	.00	67.35	2.81	70.16	8.69	.04	2.71	.00	8.65	2.71	11.36
1911.....	53.57	.19	4.08	.00	53.38	4.08	57.46	11.12	.01	3.53	.00	11.11	3.53	14.64
1912.....	50.40	.18	4.52	.00	50.22	4.52	54.74	9.24	.01	2.30	.00	9.23	2.30	11.53
1913.....	42.35	.09	7.40	.00	42.26	7.40	49.66	4.34	.00	1.25	.13	4.34	1.12	5.46
1914.....	20.54	.59	3.98	.00	19.95	3.98	23.93	9.00	.03	1.16	.02	8.97	1.14	10.11
1920.....	.01	.05	.04	.01	(.04)[b]	.03	(.01)[b]	.51	.00	.16	.00	.51	.16	.67
1921.....	2.78	.00	1.02	.00	2.78	1.02	3.80	2.44	.00	.84	.00	2.44	.84	3.28
1922.....	.93	.00	1.19	.00	.93	1.19	2.12	3.85	.00	1.03	.00	3.85	1.03	4.88
1923.....	1.02	.00	1.53	.00	1.02	1.53	2.55	2.93	.00	.58	.00	2.93	.58	3.51
1924.....	4.50	.01	6.03	.00	4.49	6.03	10.52	.44	.42	.62	.09	.02	.53	.55
1925.....	.19	.68	1.36	.30	(.49)[b]	1.06	.57	1.29	1.26	.98	.20	.03	.78	.81
1926.....	9.98	.04	5.56	.00	9.94	5.56	15.50	1.33	.00	2.29	.00	1.33	2.29	3.62
1927.....	7.69	.02	3.52	.00	7.67	3.52	11.19	1.45	.00	.77	.00	1.45	.77	2.22
1928.....	1.03	.....	1.31	...	1.03	1.31	2.34	.75	.04	.44	.00	.71	.44	1.15

* Data from *International Yearbooks of Agricultural Statistics*. Except for Hungary, pre-war data are on the Julian calendar. Flour has been converted to wheat on 70 per cent basis. Dots (....) indicate that data are not available.

[a] Serbia in pre-war years.
[b] Net import.
[c] First 6 months.
[d] Includes rye and other unspecified cereals.

TABLE XII.—INTERNATIONAL TRADE OF THE DANUBE COUNTRIES IN WHEAT AND WHEAT FLOUR, BY AUGUST–JULY CROP YEARS, AVERAGE 1909–10 TO 1913–14 AND ANNUALLY, 1920–21 TO 1927–28*

(Million bushels)

Year August–July	Hungary							Jugo-Slavia						
	Wheat		Flour		Wheat net exports	Flour net exports	Total net exports	Wheat		Flour		Wheat net ex-ports	Flour net ex-ports	Total net ex-ports
	Ex-ports	Im-ports	Ex-ports	Im-ports				Ex-ports	Im-ports	Ex-ports	Im-ports			
Average 1909–14..	15.13	6.73	35.24	.51	8.40	34.73	43.13	....	...	....	...	....	....	....
1920–21..	.00	.00	.24	.25	.00	(.01)[a]	(.01)[a]	1.77	...	1.99	...	1.77[b]	1.99[b]	3.76[b]
1921–22..	.71	.00	8.70	.00	.71	8.70	9.41	2.07	...	1.83	...	2.07[b]	1.83[b]	3.90[b]
1922–23..	.07	.22	5.31	.00	(.15)[a]	5.31	5.16	.25	...	.76	...	.25[b]	.76[b]	1.01[b]
1923–24..	5.90	.00	10.89	.00	5.90	10.89	16.79	3.89	...	1.95	...	3.89[b]	1.95[b]	5.84[b]
1924–25..	4.74	.65	9.46	.01	4.09	9.45	13.54	6.29	...	3.25	...	6.29[b]	3.25[b]	9.54[b]
1925–26..	11.34	.03	8.48	.00	11.31	8.48	19.79	9.46	.10	2.13	.63	9.36	1.50	10.86
1926–27..	14.47	.00	7.41	.00	14.47	7.41	21.88	8.29	.00	1.45	.04	8.29	1.41	9.70
1927–28..	12.01	.00	9.84	.00	12.01	9.84	21.85	.95	.27	.22	.35	.68	(.13)[a]	.55
	Roumania							Bulgaria						
Average 1909–14..	48.51[c]	.20[c]	5.09[c]	.00[c]	48.31[c]	5.09[c]	53.40[c]	8.92	...	2.34	...	8.92[b]	2.34[b]	11.26[b]
1920–21..	.72	.01	.70	.00	.71	.70	1.41	1.38	.00	.39	.00	1.38	.39	1.77
1921–22..	2.98	.00	.54	.00	2.98	.54	3.52	3.39	.00	1.13	.00	3.39	1.13	4.52
1922–23..	.27	.00	1.37	.00	.27	1.37	1.64	3.54	.00	.77	.00	3.54	.77	4.31
1923–24..	4.61	.00	4.37	.00	4.61	4.37	8.98	1.78	.01	.69	.01	1.77	.68	2.45
1924–25..	.81	.49	3.19	.30	.32	2.89	3.21	.08	1.67	.17	.28	(1.59)[a]	(.11)[a]	(1.70)[a]
1925–26..	6.21	.24	3.96	.00	5.97	3.96	9.93	2.20	.00	2.18	.01	2.20	2.17	4.37
1926–27..	6.62	.00	4.59	.00	6.62	4.59	11.21	.68	.00	1.57	.00	.68	1.57	2.25
1927–28..	5.43	...	2.06	.00	5.43[b]	2.06	7.49	1.53	.03	.54	.00	1.50	.54	2.04

* Data from *International Yearbooks of Agricultural Statistics*. Dots (....) indicate that data are not available.

[a] Net import.

[b] Gross, not net.

[c] Three-year average, 1911–12 to 1913–14.

TABLE XIII.—SEASONAL MOVEMENT OF WHEAT (INCLUDING FLOUR AS WHEAT) EXPORTS FORM THE DANUBIAN COUNTRIES, PRE-WAR AND POST-WAR*

(Million bushels)

	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
Hungary												
1904–09[a]	4.85	4.98	5.12	4.98	4.67	3.06	3.00	4.63	3.93	4.10	3.59	3.41
1909–14[a]	4.71	4.70	4.89	4.60	4.16	2.40	2.53	3.57	3.30	3.29	2.43	3.08
1924–29[b]	2.54	2.91	2.73	2.24	1.72	1.12	1.10	1.26	1.25	1.42	1.16	1.18
Jugo-Slavia												
1904–09	....	....	....	....	....	....	....	....	....	....	....	....
1909–14	....	....	....	....	....	....	....	....	....	....	....	....
1924–29[b]	1.35	1.75	1.20	.89	.76	.36	.25	.21	.37	.33	.29	.35
Roumania												
1904–09	....	....	....	....	....	....	....	....	....	....	....	....
1909–14[c]	10.64	8.01	6.74	5.90	5.20	2.05	1.80	3.64	3.14	2.38	1.52	3.79
1924–29[bd]	.83	.92	.97	.71	.40	.25	.32	.25	.41	.97	1.04	.55
Bulgaria												
1904–09[e]	1.00	1.57	1.42	1.85	1.14	.90	.68	.99	1.14	1.15	.67	.44
1909–14[e]	.63	1.02	1.05	1.13	1.04	.89	.98	1.23	1.11	.99	.78	.40
1924–29	....	....	....	....	....	....	....	....	....	....	....	....
Four countries												
1904–09[e]	5.85	6.55	6.54	6.83	5.81	3.96	3.68	5.62	5.07	5.25	4.26	3.85
1909–14[f]	15.98	13.73	12.68	11.63	10.40	5.34	5.31	8.44	7.55	6.66	4.73	7.27
1924–29[g]	4.72	5.58	4.90	3.84	2.88	1.73	1.67	1.72	2.03	2.72	2.49	2.08

* Pre-war averages from *International Yearbook of Agricultural Statistics, 1913–14.* Post-war data from *International Crop Report and Agricultural Statistics.* Dots (....) indicate that data are not available.

[a] Net wheat and gross flour exports.
[b] Net exports.
[c] Gross exports.
[d] Four-year average, 1925–29. Data for the months October–December, 1925, and August–October, 1926, have been estimated.
[e] Hungary and Bulgaria only.
[f] Excluding Jugo-Slavia.
[g] Excluding Bulgaria.

TABLE XIV.—MONTHLY AVERAGE CASH PRICES OF WHEAT AT BUDAPEST, 1923–28*

(U.S. dollars per bushel)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	1.334	1.338	1.275	1.401	1.357	1.276	1.365	1.196	1.367	1.391	1.486	1.463
1924.....	1.413	2.055	1.279	1.201	1.126	.937	1.326	1.435	1.462	1.584	1.623	1.752
1925.....	2.242	2.248	2.003	1.968	1.934	1.991	1.607	1.460	1.424	1.395	1.367	1.526
1926.....	1.509	1.471	1.488	1.530	1.618	1.639	1.412	1.349	1.344	1.492	1.506	1.530
1927.....	1.586	1.649	1.649	1.654	1.669	1.378	1.411	1.465	1.459	1.449	1.448	1.455
1928.....	1.502	1.524	1.590	1.651	1.623	1.560	.....	.....	.....	.....	.....	.....

* Data for 1923–25 from *Annuaire statistique hongrois 1923–27,* for 1926–28 from *Bulletin statistique mensuel hongrois.* The prices given above are derived chiefly from price data applicable to wheat weighing 78 kilograms per hectoliter and originating in the Fejer, Budapest, and Tisza districts of Hungary. The prices of 79 kilogram wheat were used for the months September 1923 to January 1924, in the absence of quotations for 78 kilogram wheat. Hungarian currency converted to U.S. dollars at monthly average rates of exchange for cable transfers.

TABLE XV.—DANUBIAN EXPORTS OF WHEAT AND WHEAT FLOUR BY PRINCIPAL COUNTRIES OF DESTINATION, ANNUAL AVERAGES 1908–12 AND 1923–27*

(*Million bushels*)

Items	Germany	Austria	Belgium	France	British Isles	Italy	Netherlands	Switzerland	Poland	Czecho-Slovakia	Hungary	Jugo-Slavia	Roumania	Bulgaria	Russia	Greece	Turkey	Egypt	Gibraltar	Others
Hungary																				
Wheat																				
1908–12	...[a]	14.51[b]	...	...	...	...	...	...[c]	...	....	...	...[a]	....	...	...	....	....	...	....	.01
1923–27[c]	.26	4.69	...	...	...	1.07	...	.05	.68	4.06	...	.04	....	...	...	....	....	...	....	...
Flour																				
1908–12	.20	33.20[b]	.01	.07	.35	.03	.03	...	...	....	...	.01	....	.02	...	....	....	...	....	.21
1923–27[c]	.12	5.17	...	...	.03	.11	...	.36	.63	3.03	...	.04	....	...	...	.08	....	...	....	...
Jugo-Slavia																				
Wheat																				
1908–12	.67	1.04[d]	1.08	...	...	...	...	...	...	....	...	...	.39	.04	...	....	.41	...	....	.01
1923–27	...[a]	1.27	.02	...	.01	.48	...	...[a]	..[a]	1.35	.50	...	1.56	.14	...	.53	....	...	....	.01
Flour																				
1908–12	...	....	...	...	...	...	...	...	...	....	...	...	....	...	...	....	....	...	....	...
1923–27	.01	1.15	...	...[a]	...	.08	...	...[a]	...[a]	.45	.10	...	....[a]	.05	...	.05	....[a]	...	....	.03
Roumania																				
Wheat																				
1908–12	1.07	3.85[d]	21.02	2.89	1.50	6.86	5.67	...	...	....	...	...	....	...	.23	.01	1.01	...	1.51	.25
1923–27[c]	.34	.49	.32	.30	.21	.18	.07	...	..[a]	.12	.21	...[a]	....	.02	...	.07	.58	...	.01	.03
Flour																				
1908–12	.19	.41[d]	.07	.01	.18	...	.14	...	...	....	...	...	....	...	...	.01	1.02	.61	....	.13
1923–27[c]	.02	1.37	...[a]	...[a]	...[a]	.01	.02	.29	4.1	.60	.83	...	....	...[a]	...	.16	.05	.02	.01	.01
Bulgaria																				
Wheat																				
1908–12	.24	.21[d]	3.83	.46	.61	.38	.05	...	...	....	...	...	....[a]	...	...	1.13	1.27	...	....	.38
1923–27	...	...[a]	.03	.05	...	.02	...	...	...	....	.02	...	....	...	...[a]	.61	.44	...	.01	.25
Flour																				
1908–12	.01	...	...	...	...	...	...	...	...	....	...	...	....	...	...	.03	1.83	.31	....	.07
1923–27	.01	.05	...	.01	...	.04	...	...	...	.02	...	.01	....	...	...	.78	.05	.03	....	.07

* Pre-war data from *Annuaire international de statistique agricole 1913–14;* post-war data from official sources for each country. Dots (....) indicate no exports reported.

[a] Exports of less than 5,000 bushels.
[b] Includes Bosnia–Herzegovina.
[c] Four-year average, 1925–28.
[d] Austria–Hungary.
[e] Two-year average, 1923–24.