Macedonia is the birthplace of Alexander III the Great (356-323 BC). The history of the ancient Macedonian kingdom begins with Caranus, who was the first known king (808-778 BC). The Macedonian dynasty Argeadae originated from Argos Orestikon, a city located in the south western Macedonia region of Orestis. By 65 BC Rome conquered the Seleucid Macedonian kingdom in Asia under its last king Antiochus VII. Finally, the defeat of Cleopatra VII in 30 BC brought an end to the last of the Macedonian dynasties in Egypt, and with it, the last remains of the Macedonian Empire that was once the mightiest in the world disappeared from the face of the earth. In the 9th century (AD – Ed.), while the Byzantine Empire was ruled by the Macedonians, Emperor Constantine VII. Finally, the defeat of Cleopatra VII in 30 BC brought an end to the Macedonian dynasty, the Macedonian brothers Cyril and Methodius from the largest Macedonian city of Salonica, created the first Slavonic alphabet, founded the Slavic literacy, and promoted Christianity among the Slavic peoples. Macedonia remained a Byzantine territory until the Ottoman Turks conquered it in 1389. In the 19th century, Greece, Serbia, and Bulgaria freed themselves from the Turkish rule and actively began conspiring against the Macedonians displaying territorial aspirations on their land. In 1912, Greece, Serbia, and Bulgaria joined forces and defeated the Turkish army in Macedonia. 100,000 Macedonians also participated and helped in the Turkish evacuation but the victors did not reward them. The Treaty of London (May 1913), which concluded the First Balkan War, left Bulgaria dissatisfied with the partition of Macedonia among the allies which resulted after the war. Bulgaria’s attempt to enforce a new partition in a Second Balkan War failed, and the Treaty of Bucharest (August 1913) confirmed a pattern of boundaries that (with small variations) has remained in force ever since” (historyofmacedonia.org, 2012).

“In the epoch between the two World Wars (1918-1941), the Military Geographic Institute (MGI) of the Kingdom of Yugoslavia (Vojni Geografski Institut Kraljevine Jugoslavije), the agency responsible for geodetic survey and mapping, made a great effort towards unification of the triangulation and production of a uniform map covering the entire national territory, a considerable part of which never was surveyed. WWII prevented the completion of this project. After WWII, under different circumstances, the Geographic Institute of the Yugoslav People’s Army (Geografski Institut Jugoslovenske Narodne Armije (GIJNA)) has been quite successfully proceeding with the work initiated by its predecessor. From 1917-1924, the Clarke 1880 ellipsoid (\(a = 6,378,249.145, \\frac{1}{f} = 293.465 – Ed.\)) was used by the Military Geographic Institute. In order to obtain geographic coordinates uniform with the geographic coordinates of the Austro-Hungarian Military Triangulation which covers the western part of Yugoslavia and because the Direction General of Cadastre and State Domains (Generálna Direkcija Katastra I Državnih Dobara) already had adopted the Bessel ellipsoid, the geographic coordinates of Serbian triangulation referring to Clarke 1880 ellipsoid were transformed to (the) Bessel (1841) ellipsoid \(a = 6,377,397.155, \\frac{1}{f} = 299.1528128 – Ed.\). The degree survey which includes the arc along the 22° meridian observed in 1927-1930 was computed on the International (Hayford 1909) ellipsoid \(a = 6,378,388, \\frac{1}{f} = 297 – Ed.\) for the purposes of the International Geodetic Association.

“After a careful analysis of the Strumica base line the Federal Geodetic Administration published the following mean total relative error: Strumica base line \(E_r = \pm 9.4 \text{ mm} / 6623.806 = \pm 1/7,000,000\) or \(\pm 1.4 \text{ mm/km}\). The density of triangulation in Macedonia is 1 trig point to 1.6 km\(^2\).
constructed in the polyhedral projection. (Identical to the Local Space Rectangular projection discussed in the Manual of Photogrammetry, 5th edition, Chapter 3 - Ed.)

1. The Gauss-Krüger (Transverse Mercator) projection of 3° zones with starting meridian Greenwich, central meridian 15°, 18°, 21° (only 21° for Macedonia – Ed.) East of Greenwich and scale factor 0.9999, used since 1924 in the Yugoslav Cadastral survey, was in 1949 introduced in the construction of sheets of the Yugoslav military maps. (False Easting = 500 km. – Ed.)

   The sheets are cut in the graticule system of the International map. The I33, L34, K33 and K34 sheets at 1:1,000,000 scale with dimensions 4° x 6° cover the area of Yugoslavia.

2. The polyhedral projection. In an attempt to assure continuity with the Austro-Hungarian mapping the Military Geographic Institute of the Kingdom of Yugoslavia in the construction of the plane table sheets and maps used the polyhedral projection with starting meridian of Paris (20° East of Ferro or 2° 20′ 13.98″ East of Greenwich). The sheets were cut along the meridians and parallels.

   In 1922, baselines were observed at Strumica (6,623,806 m ± ½,158,000) and at Prilep (5,982,555 m ± 1/5,489,000) with Jäderin base apparatus. Concerning the accuracy of measurement of base lines it should be mentioned that the ± 0.5″ fraction given with the lengths of base line represent so-called internal accuracy of the base line derived from the consistency between the forward and backward measurements. This internal error does not include systematical errors caused by the apparatus and its constants (calibration of invar wires by the Bureau International des poids et mesures Sevres, France is carried out by a mean error up to ± 22 microns which would produce an accumulation of systematical error up to 0.92mm/km). After a careful analysis of the Strumica base line the Federal Geodetic Administration published the following mean total relative error:

   Strumica base line \( E_1 = \pm \frac{1.4}{\sqrt{2}} \) mm/km = ±1/7000,000 or ±1.4 mm/km. The density of triangulation in Macedonia is 1 trig point to 1.6 km².

   "The vertical control of Macedonia refers to the leveling datum Trieste, Molto Sartorio of which the elevation of starting benchmark within one year (1875) of observations of tidal gauge was dened to be +3.352 meters above the mean sea level of the Adriatic Sea" (Mapping of the Countries in Danubian and Adriatic Basins, Andrew M. Glusic, Army Map Service Technical Report No. 25, June 1959).

   The Hermannskogel 1871 Datum origin is at: \( \Phi_0 = 48° 16′ 15.29″ \) N, \( \Lambda_0 = 33° 57′ 41.06″ \) East of Ferro, where Ferro = 17° 39′ 46.02″ East of Greenwich and azimuth to Hundsheimer is \( \phi = 107° 31′ 41.7″ \), and is referenced to the Bessel 1841 ellipsoid. Technical Report 8350.8 lists three-parameter transformation values for Yugoslavia (prior to 1990) for Slovenia, Croatia, Bosnia and Herzegovina and Serbia but not for Macedonia. Nevertheless, the consistency of the triangulation per Andrew M. Glusic's analysis leads me to believe that the transformation is valid for Macedonia from Hermannskogel 1871 Datum to WGS84 Datum: \( \Delta X = +682 \) m, \( \Delta Y = -203 \) m, \( \Delta Z = +480 \) m. Note that these are "Non-Satellite Derived Transformation Parameters."

The contents of this column reect the views of the author, who is responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reect the official views or policies of the American Society for Photogrammetry and Remote Sensing and/or the Louisiana State University Center for Geoinformatics (C²G).