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SETTLEMENT HISTORY AND SUSTAINABILITY IN THE CARPATHIANS IN THE EIGHTEENTH AND NINETEENTH CENTURIES

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Abstract: As part of a historical study of the Carpathian ecoregion, to identify salient features of the changing human geography, this paper deals with the 18th and 19th centuries when there was a large measure political unity arising from the expansion of the Habsburg Empire. In addition to a growth of population, economic expansion - particularly in the railway age - greatly increased pressure on resources: evident through peasant colonisation of high mountain surfaces (as in the Apuseni Mountains) as well as industrial growth most evident in a number of metallurgical centres and the logging activity following the railway alignments through spruce-fir forests. Spa tourism is examined and particular reference is made to the pastoral economy of the Sibiu area nourished by long-wave transhumance until more stringent frontier controls gave rise to a measure of diversification and resettlement. It is evident that ecological risk increased, with some awareness of the need for conservation, although substantial innovations did not occur until after the First World War

Rezumat: Ca parte componentă a unui studiu asupra ecoregiunii carpatice, pentru a identifica unele caracteristici privitoare la transformările din domeniul geografiei umane, acest articol se referă la secolele XVIII și XIX când au existat măsuri politice unitare ale unui Imperiu Habsburgic aflat în expansiune. Pe lângă creșterea populației și dezvoltarea economică, în perioada implementării rețelelor de căi ferate s-a conturat o presiune crescândă asupra resurselor, fenomen evidențiat prin colonizarea zonelor montane (precum Munții Apuseni) și prin creșterea industrială specifică unui număr mare de centre siderurgice și de activitate forestieră, care au urmărit direcțiile de cale ferată. Stațiunile turistice sunt examinate de asemenea, și o referință cu totul specială este acordată economiei pastorale a zonei Sibiului caracterizată prin activități de transhumanță până în perioada când strictele controale de frontieră au determinat o diversificare și o reșezare a acestei activități. Este evident că riscul ecologic a crescut, de unde și o

conștientizare a necesității pentru conservarea naturii, neapărând inovații substanțiale până la Primul Război Mondial.

Key words: *The Carpathian ecoregion, Habsburg Empire, settlement history*
Cuvinte cheie: *Ecoregiunea carpatică, Imperiul Habsburgic, istoria așezărilor*

This study examines the settlement history of a major European ecoregion (Figure 1) where a high degree of unity in resources and development potentials has been combined with generally divisive political influences in what is a marginal area within the wider context of the European periphery. A previous paper has traced the evolution from prehistory to the Medieval period, paying particular attention to the significance of Carpathian settlement for the emergence of the Romanian nation (Turnock 2003). This further contribution deals with some two centuries of modernisation when the Habsburg Empire controlled most of the Carpathian territory. The record is one of increasing pressure by mercantilist and capitalist forces to intensify agriculture and commercialise the forests, mineral resources and tourist opportunities; spreading along the axis of high ground through the heart of East Central Europe from the northwest to the southeast. There has been considerable environmental change in the process (which can only be tentatively correlated with specific trends in the human geography) but the scale of transformation has been modest by lowland standards and the impact of urbanisation (discussed only contextually in this paper) is evident mainly on the margins, apart from intramontane depressions which have seen much industrialisation (e.g. Brașov and Reșița).

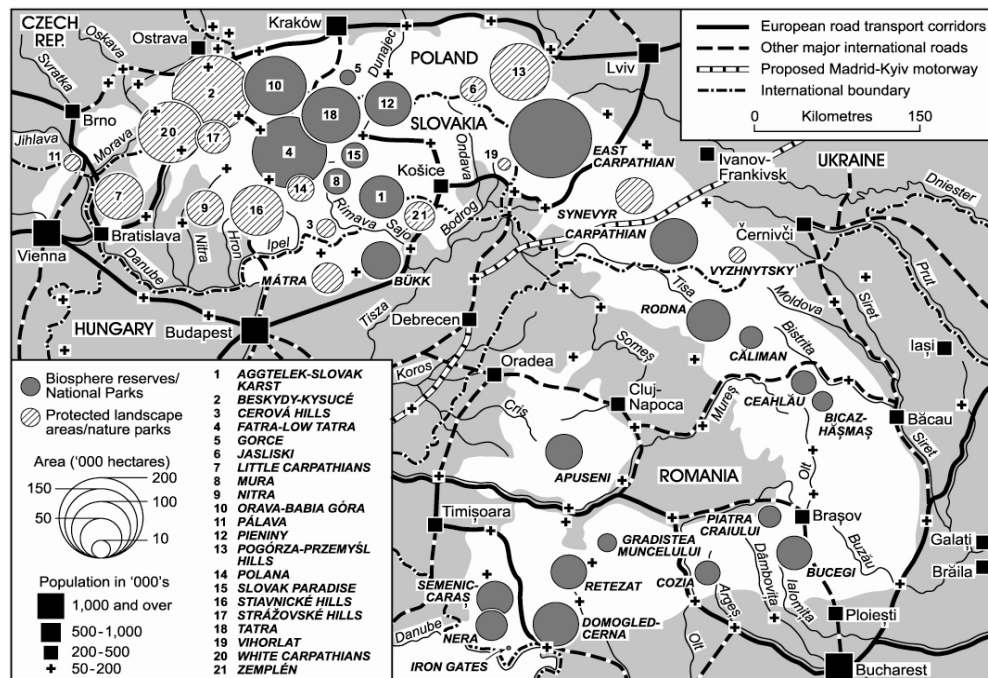


Figure 1: The Carpathians: settlement, communications and parks.

The mountains have not been seriously degraded and retain a relatively high level of biodiversity as the most valuable area within Europe's temperate conifer and broadleaf forests. About half the land is forest - including fragments of natural mountain beech forest and valuable stands of Norway spruce - and a third comprises open, semi-natural habitats (predominantly grassland) extending to subalpine and alpine zones where meadows and brushwoods are typical.

There is much diversity within the Carpathian region given the geological variety arising from a tectonic movement that resembles the fashioning of the western mountain edge of north and south America (Schroke 1994, p.127). Gneiss and limestone comprise the main massifs with high biodiversity values; not to mention the erosion surfaces valuable for seasonal pastoralism and folk festivals as well as modern 'alpine' tourism. Volcanic intrusions and extrusions along the inner rim have given rise to ore bodies (after cooling and crystallisation) to provide a basis not only for the legendary gold treasure of the Thracians but also for the Medieval and modern mining industry - with copper in the Matra, iron ore in Banat and non-ferrous ores with high gold-silver content in the Apuseni (Abrud, Brad and Zlatna), Maramureş (Baia Mare) and Slovakia. Moreover there are mineral waters that have given rise to a network of spa resorts unrivalled across the continent. On the outer edge sandstone-clay-shale alternations predominate in the unstable Subcarpathians - including some sandstones with characteristic shapes at Skamieniale Miasto ('Petrified City') and the sandstone tors like Diabli Kamień ('Devil's Rock'). At the contact with the Lower Danube plains this zone has become relatively overpopulated for security is combined with relatively immature soils with reserves of moisture and fertility. On the other hand, the instability of much of the terrain - where inclined geological layers can slide over each other - is expressed through landslides and mudflows that constantly menace the infrastructure.

Further differentiation arises from the climate-soil-vegetation complexes arranged by altitude from the valleys and foothills to the highest peaks of the Tatra: Rysy 2,499m Mięguszwiecki Szczyt 2,438m (Groch et al. 2000). Gorz & Rajman (1988) demonstrate the climatic constraints for crops, given the incidence of frost in spring and autumn, but the submontane zone is more attractive with loess-covered soils, as are the intramontane basins like Kotlina Sądecka and Doly Jasielsko-Krośnieńskie (Figure 2). Here there is a recent history of population pressure and deforestation which also affects parts of the Beskid Makowski and Beskid Wyspowy. The Carpathian foothills have a mean annual temperature of 7-8deg. at the most, with at least 750mm of rainfall and snow lying for 60 days; mixed forests of pine and oak occur alongside fir and beech - heavily deforested in areas with high agricultural potential like the Silesian Foothills. There is greater stability above 500m where primeval woodland is protected in order to reach 70% in the Bieszczady, with its post-1945 resurgence linked with the disturbance of the Rusyn and Ukrainian population blamed (often unfairly) for the wartime atrocities of nationalist forces. Limestone caves and mineral waters are associated with volcanic activity and the Beskid Sądecki Mountains contain much of Poland's 'szczawa' type mineral water. Snow lies for 100-290 days and rainfall varies from 1,000-1,600mm over the succession from (a) the lower subalpine zone ('dolny regiel': below 1,250m) with fir-beech and some spruce and sycamore - though spruce is now dominant through human interference; to (b) the upper subalpine forest ('górný regiel': 1,250-1,550m) with firwood of a partially primeval character and Siberian cedar, Carpathian birch and rowan at the upper limit; (c) the mountain pine zone at 1,550-

1,800m; with (d) pasture and meadow ('hale') at 1,800-2,300m; with (e) bare rock faces ('turnia') beyond.

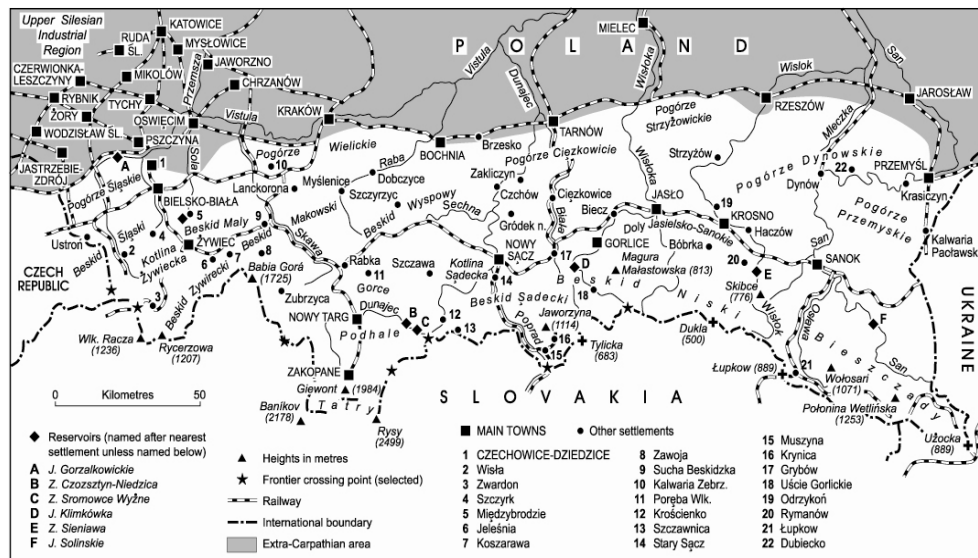


Figure 2: The Polish Carpathians.

Despite a substantial trawl through the literature there remains the hazard of generalisation from limited empirical data. An undoubted degree of cultural and ecological unity is only slowly being rediscovered (Turnock 2002), for the region has rarely been studied as a unit in the past and material is distributed across a very wide range of books and journals, embracing diverse languages reflecting the coinhabiting nationalities and former imperial powers. There is the added problem of imbalance in that for four of the six of today's Carpathian countries (Czech Republic, Hungary, Poland and Ukraine) the mountains are hardly central to national life, comprising well below ten percent of national territory - with a peripheral location as well - and in two of these cases (Czech Republic and Hungary) the total areas involved are very small. By contrast, the Carpathians play a more integral role in Romania (40.1% of national territory) and Slovakia (77.8%). In the latter case three hills represent the mountains in the country's state symbol, although the origins of Slovakia and its economic development tend to highlight the lowland zones on either side despite the importance of the mountains around Banská Bystrica for the Slovak Uprising of 1944. By contrast, in Romania the Carpathians have been accorded a very great importance central to the survival of a Romanised Dacian population as the basis of the Romanian state; not to mention a tendency to idealise the peasant way of life as the mountains became a playground for an increasingly urbanised population and for a growing number of foreign travellers too. So the paper shows some bias, especially in view of the author's familiarity with the Romanian language literature. For the sake of simplicity placenames are given according to their present state subordination.

THE EIGHTEENTH CENTURY: NEW SETTLEMENT FRONTIERS

This period registers an element of integration given the growing strength of the Habsburg Empire, along with Prussia and Russia, combined with the Partitions of Poland and the first stage in the rolling back of the Ottoman tide. The Habsburgs expanded from their bridgehead in northwestern Hungary to gain control of Pannonia and Transylvania and ultimately extend beyond the Carpathian crestline into Galicia (Figure 3). Limiting the Habsburg monopoly was continuing Ottoman suzerainty over Moldavia and Wallachia, despite a brief Habsburg occupation of Oltenia - western Wallachia - during 1718-39. A military defence strategy based on roads and fortresses needed the resources supplied by economic development and the result was a mercantilist era of growth which eventually gave way to private enterprise. This period therefore registers a further increase in human pressure with some pastures converted to arable by the ploughing of high surfaces and gentle slopes, though typically along the contour. There was also excessive grazing of communal lands and some forest deterioration, accentuated by the invasion of beechwood by fast-growing species (pine and larch) “neglecting the natural conditions of the forest habitats” (Pietrzak 1998, p.34).



Figure 3: Political organisation: 19th century.

Space prevents any detailed review of urban developments, although there seems no doubt that the Carpathian economy was being based increasingly on the towns, small though they were compared with their lowland counterparts. In southern Poland, landscaping did not impinge greatly on the Carpathians but the small Middle Beskid town of Sucha Beskidzka saw its 17th century castle - now the local museum - redeveloped in the Baroque style with a surrounding park. Merchant communities were moving into new houses while the beginnings of tourism based on the curative properties of mineral waters originate in this period, especially the 'szczawa' waters of the Beskid containing ferruginous substances. Renamed Krynica, the village of Krzyczyn in the Beskid Sądecki Mountains acquired its first spa amenities in 1793 while Muszyna, caput of an estate - on the trade route to Hungary - belonging to the Bishop of Kraków capitalised on its mineral waters containing ferruginous substances. Żegiestów-Zdrój also emerged in the same area, along with Ustron in the Silesian Beskid: an iron producer that became a health resort when the hot slag gained a therapeutic use in the local 'gierzymowe' baths. Meanwhile growth in Slovakia highlights primarily the urban cluster in the west (close to Bratislava) along with the Humenné-Košice-Prešov group in the east and a small group in between at Orava, Poprad and Spišská Nova Ves (Ivanička 1999 p.221).

Since the late 17th century and 18th centuries were plagued by wars and "systematic burning of villages, plundering and destruction of crops and livestock caused starvation and numerous epidemics" - and associated demographic and economic changes (Pietrzak 1998, p.31), Habsburg annexation of Galicia (1772) under the Polish partitions was accompanied by a measure of recolonisation under Josef's decree. Germans from the Rhineland gave a boost to Bochnia in 1782 when it became an administrative centre close to historic trade routes and witnessed commercial exploitation of the salt mines as well as the forests and the agricultural potential. This growing rural population pushed agriculture to the intermediate slopes and plateau lands where only a few patches of fir and beech woodland are now preserved; and with some degradation as intensive run-off carried much more sediment to the rivers (Lac 2000, p.204). Oats were grown much more extensively and accounted for 80% of the land cropped in any one year in Poland at the end of the century; with the balance taken mainly by potatoes and clover (Kurek 1984). Registers of the late 18th and early 19th centuries reveal conversion of meadows and pastures to arable and much logging, driven by settlement linked with profit and high taxation. At the same time variable weather and the poor condition of some of the land increased the risks of harvest failure with consequent instability in the ownership structure. The forests in the north were being seriously eroded (and beekeeping declined as a result), with the frequent appearance of the Polish placename element 'poręba', referring to the cutting of timber - often in connection with industrial settlements producing charcoal and tar within the forests. Ivanička (1999 p.212) refers to the devastation of woodland in Slovakia by the 18th century through mining, industry (bricks, glass and potash) and timber exports. However, an increase in wood prices demonstrated the need for the improved forest management regime worked out by the Forestry Faculty of Banská Štiavnica Mining College. More generally, the Teresian period saw forest management codes issued from 1769. In Poland fast-growing pine and larch were favoured over deciduous forest dominated by beech. All this impacted on pastoral farming since the landlords demanded higher leasing fees - and therefore forced more intensive grazing - while trying to prevent further erosion of woodlands to which end the keeping of goats was often forbidden. In some cases shepherding associations or cooperatives retained a hold on their pastures (as in Těšín and

Vsetín) while in Hukvald the forestry interest predominated and seasonal sheep farms were eliminated by the middle of the 19th century.

The Habsburgs also presided over the growth of the iron industry in Galicia. Ustron - first mentioned 1305 as an episcopal estate - acquired a foundry in the 18th century to work up low-grade iron ore. Meanwhile Kuznica in the Zakopane area of the Tatra was engaged in mining and foundry work. But since virtually the entire mountain system was now under the control of Vienna, the greater rhythm of commercial activity and systematic resource exploitation can be seen more widely. The greatest transformation occurred in the Banat Mountains, at the southwestern extremity of the Carpathian system, where a major settlement programme followed the recovery of territory from the Turks in 1699. Because of the Turkish invasions most villages lay in narrow valleys or along spring lines. And as the Habsburgs made Banat a place of multi-ethnic Catholic colonisation, German, Hungarian and Slovak colonists (also some Bulgarians) were established on the edge of Romanian or Serb villages, with assimilation or displacement of natives to other parts of Banat. Agricultural development was largely confined to the lowlands, while the minerals of the Carpathians were exploited by the 'Banater Bergwerk-Einrichtungs-Kommission' set up in 1717. As skilled miners were brought from Bohemia, Styria, Tyrol and Zips, a copper smelter was opened at Oravița in 1718 and an iron furnace Bocșa followed in 1719; the latter expanded into a large metallurgical complex on the edge of the Anina, Dognecea and Semenic Mountains with the Reșița furnace of 1771 as the main element (Hillinger & Turnock 2001) (Figure 4). Nearby in the Poiana Rusca there were installations at Bistra (now Oțelu Roșu) in 1795. Reference should also be made to the coal first discovered within the woodcutting community of Steierdorf-Anina in 1790 and the mining industry which developed with the help of skilled workers from Bohemia and Slovakia.

Settlement adjustments in the Romanian Carpathians

Towns like Hațeg, Sebeș and Sighetul Marmăției were playing an important commercial role; to say nothing of the transit traffic organised in Curtea de Argeș, Câmpulung and Râmnicu Vâlcea (Giurcăneanu 1988 p.132). However, population pressure forced people to find subsistence wherever it might be available and to survive with only tenuous market links. There was continued movement by Romanians (known as 'Ungureni' because there were from territory under Hungarian administration) from Transylvania to Moldavia and Wallachia, with only spasmodic migrations in the opposite direction. Tufescu (writing in 1986 in response to Hungarian claims that Romanians were moving into Transylvania) tells how Habsburg appeals for Ottoman cooperation to restrict the flow out of the province produced a compromise that nevertheless enabled some 32,000 Romanians (mainly from the Bistrița area) to settle in the Suceava-Solca-Câmpulung Moldovenesc-Valea Moldovei quadrilateral of Bucovina during 1747-76. But equally important was dispersed settlement on the higher ground (Metes 1977; Popp 1942). In this way a conflict has developed in rural study between a functional approach working through urban systems and an ecological slant linking rural communities to their local territorial circumstances. The latter emphasis, adopted by R. Vuia who specialised in remote rural communities of the early 20th century (Turnock 1991b), was no doubt encouraged by the psychological affinity of the Romanians to pastoralism in marginal areas through dispersed communities on the high surfaces committed to transhumance. Thus while some communities were able to

develop non-agricultural activities in the market centres, an alternative strategy at a time of population growth and capitalist control of low-ground agricultural resources was to maximise use of the higher surfaces for subsistence by establishing permanent hamlet settlements: each representing a gradually-expanding kinship group of individual farmsteads which often involved an enclosed courtyard appropriate for sheep rearing in exposed areas subject to the depredations of wild animals, especially in wintertime (Idu 1972).

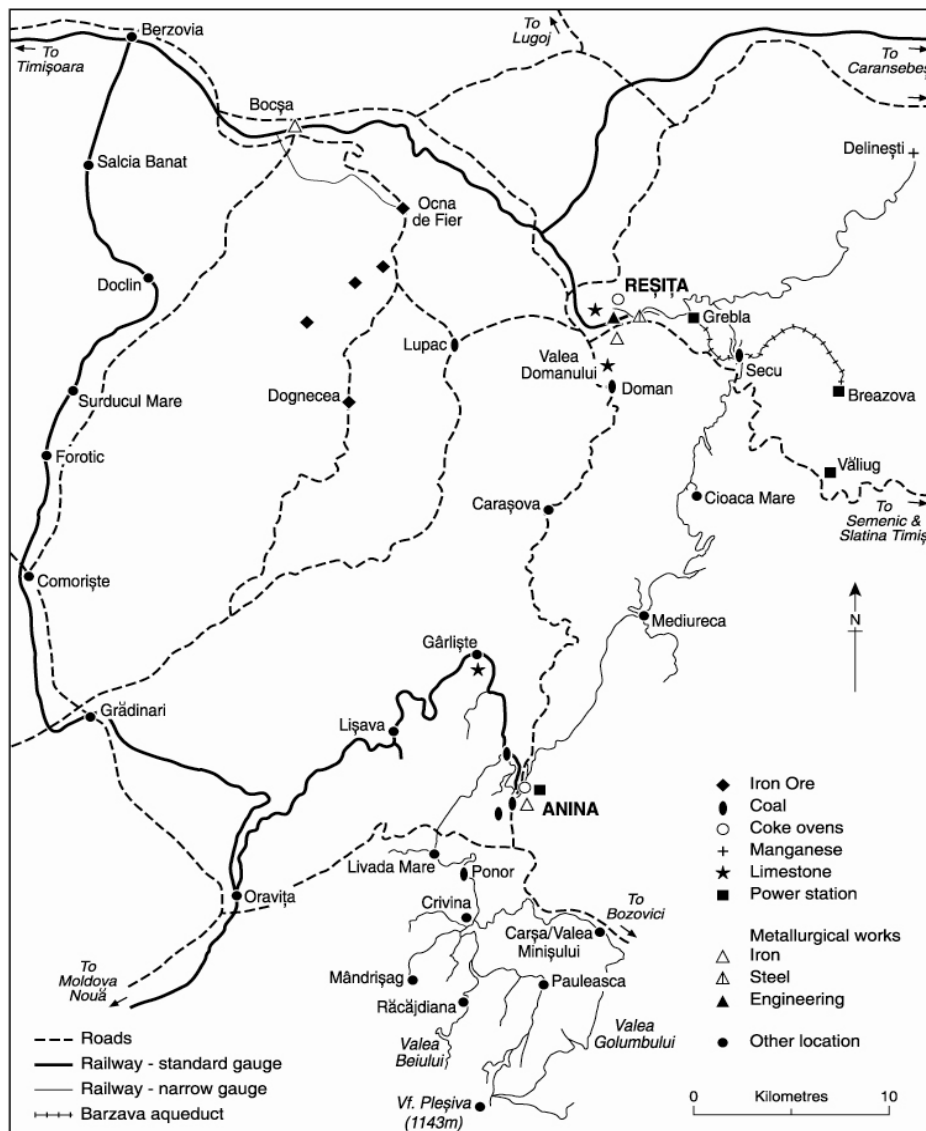


Figure 4: The Anina-Reșița industrial area.

Good examples are the platforms of the Apuseni Mountains and also the Bran-Poiana Mărului area on the edge of the Brasov depression. This explosive process of dispersal - 'proces agro-pastoral de roirii' - could have developed before the 18th century (Popa 1999, p.215) for upward movement could well have been accentuated by the last Turkish incursions - just as the peasants in the Danube Defile exercised their option of moving to clearings on the high ground during the wars of the 20th century. But in the Apuseni dispersal of settlement away from the traditional social-political cores of the Medieval period is now thought to have occurred quite late on, in contrast to earlier assumptions linking these 'Moți' communities with Dacian occupation of the high ground (De Martonne 1922 pp.63-4). The new dispersed farms were typically subdivided and new farmsteads built on the resulting fragments to create a small cluster or 'palciuri' of farms, with the name 'crâng' much used to suggest the branch of a family tree or 'matca' (Abrudan & Turnock 1999). The process, characterised by some elaborate terracing systems (Păcurar 1997), could be linked with increased feudal pressure, since the scope for commercial agriculture from the 17th century onwards led to an expansion of feudal-type obligations and it is not difficult to imagine free peasants binding themselves to perform certain duties for a wealthy farmer who had penetrated the village through bogus fraternisation procedures and made advances to them during the incidence of famine or some similar adversity. However in the case of the Apuseni the stimulus to disperse across the high surfaces could have been extended by liability to conscription and the Habsburg state's demand for feudal services to help exploit the timber and minerals of the great Zlatna domain.

The colonisation thus appears as an essentially a peacetime phenomenon. It took the Hațeg peasants to the Petrosani Basin in the upper Jiu Valley and also to 'Ținutul Pădurenilor' on the eastern flanks of the Poiana Rusca. The process has also been described for the Mehedinți Plateau where people began breaking out from the village cores in the late 18th century in order to settle on individual farms carved out of the community demesne: perhaps initially a 'palanca' or shelter, developing into a more substantial temporary dwelling or 'conac': an outlying grazing station inhabited seasonally by some family members - with limited cultivation - and eventually a permanent farmsteads, especially on a south-facing slopes (Turnock et al. 1980, p.17). However the evolution process did not necessarily move through all these stages in every area and there are districts where the 'conac' or 'târle' system still remains the norm (supplemented by longer wave transhumance movements which could involve journeys of up to 30kms to summer pastures) while permanent settlement remains concentrated in the nucleated villages. Some people still prefer the quiet seclusion of their 'conac' and may appear only rarely in their villages. There are also some situations - such as the Cerna Valley above Băile Herculane - where metamorphosis from 'conac' (belonging to the commune of Cloșani) to permanent settlement occurred only under communism as a result of new salaried employment opportunities in a formerly remote area.

Mărginenii Sibiului. The research of Irimie et al. (1985) in this zone suggests that the great pastoral enterprise was reaching its peak in terms of the extent of its transhumance activity (Constantinescu-Mircești 1976; Prodan 1944). The shepherds had long ranged across the Carpathian basin, as suggested by the placename 'Villa Staul' at 1,113m in Slovakia. The Sibiu shepherds were making regular visits to Banat, Debrecen and the Giurghiu-Căliman area of north Transylvania, but record numbers of sheep were also passing southwards from Sibiu (and Brașov) en route to Ottoman territory since the Treaty

of Passarowitz (1718) opened the way for wintering of sheep in the Lower Danube valley and Dobrogea (a journey of 12-14 days). Payment of 'beilic' to the Turks secured 'teschkere' enabling them to roam at will around Balcic, Bazargic as well as Batova ('the valley without winter'). In March they would return home, taking advantage of the Zimnicea floodplain grazings en route. Alternatively the East Carpathian customs posts of Ghimeş and Oituz gave access to the Jijia Valley, Bessarabia and even the steppes beyond. Pastoralism was stimulated by population growth and fiscal pressures, while demands for military service (especially in the 1760s in connection with border regiments at Jina and Orlat referred to below) drew the womenfolk into shepherding. However there was evidently some constraints on continued expansion of the community because of the migration of 'Ungureni' (people of Transylvanian origin) to the Principalities began at this time and Constinescu (2004, p.74) highlights the remark of Donat (1966, p.293) that some 80 new villages had been founded by Transylvanian pastoralists in the southeastern Carpathians by the end of the 18th century.

At the same time, border modifications in 1766 gave much more land to the Jina community and hence there was greater scope for local wool production. Agricultural progress centred on the potato crop and increased attention to fruit (much of which was dried) and beekeeping. Meanwhile, handicrafts in the rural areas were compromised by the monopolies maintained by the Sibiu guilds that were closed to Romanians: in 1724 the town's wheelwrights could exercise their monopoly through inspections at Răşinari, which later became a great handicraft centre. Răşinari could however supply stone, while lime was sent from Orlat. However, the increased wool production arising from the expansion of the transhumance system had positive implications for local industry: hence the multiplication of fulling mills ('pive') especially at Sălişte, Sibicel and Tilişca. There was also a growth in food and wood processing: the water-powered sawmill ('joagar') originated in the 16th century but the number increased rapidly in the 18th. The 'joagareni' worked on the cutting, transport and processing of wood, especially at Gura Râului, Răşinari and Sadu (with processing at Boiţa and Tălmăciu where joiners and producers of wooden roof tiles were well represented). There was an export of sawn timber to Wallachia. Corn and fulling mills were usually built within the village perimeters for security, whereas the sawmills were more scattered in order to economise on transport. In Sibiu itself an industrial axis developed along the Cibin with ample processing water. Canals were engineered at a higher level from the Cişnădie and Vâlcele streams to supply the town centre (for street cleaning, fire fighting and fishponds as well as drinking) with the surplus diverted down to the Cibin. Some rationalisation of the canals led to the removal of some channels and the filling in of some small storages that became irrigated vegetable gardens ('gradini de zarzavat'). But the limited water power gave the rural areas an advantage and hence the separate development of Cişnădie nearby (Haţieganu 1942).

Năsăud Frontier District. Developments of a military nature made a significant impact for it was in this century that the major European powers appreciated the fighting skills of hardy mountain dwellers. Potentially this was a help for individual families but the greatest benefits were seen on a community basis when Vienna recruited 17 frontier regiments. Under this southern military frontier strategy - arising out of the 1699 treaty as a means of cementing loyalty to the Habsburgs while simultaneously raising living standards - there were seven regiments raised along the mountain rim between Banat and the northeastern extremity of the empire (Gollner 1973). While Habsburg pressure caused some Romanians to emigrate, there seems little doubt that military service was a modernising

force during the best part of a century: 1762-1851. Popa 1999 (p.216) has explained how 'Regimentul Românesc 1 Orlat' had a company in Hațeg which offered advantages for education and training - through privileges in the relevant villages - which helped to counter the marginalisation of this mountain depression through the departure of noble Romanian families. However it is the northeastern Rodna Military District - later Năsăud Frontier District - that has been most extensively researched (Sotropa 1975). A total of 12 Companies were formed during 1762-83 with each recruited from a group of villages and the special regime lasted until a civil administration was provided in 1851. Năsăud was then granted autonomy in 1861 but this was cancelled when Hungary became responsible for administration under the compromise ('Ausgleich') of 1867 between the Habsburg emperor and the Hungarians and the county ('comitat') of Bistrița-Năsăud was created.

Under military planning there was a consolidation of the Greek-Catholic parochial structure and provision of a state education system through elementary 'Trivialschulen' from 1770 and a high school ('Școala Normală Superioară') in Năsăud in 1771 (Albu 1971). Medical and sanitary programmes provided effective barriers against the spread of plague from Moldavia in 1815 and cholera from Wallachia in 1830 (Buta & Pupeza 1994). Commerce expanded in a network of central places with their fairs and road systems, while the promotion of agriculture included attention to cereals, vegetables, potatoes, textile plants and fruit trees, along with stock rearing and allocation of grazings (Mureșianu 2000 pp.182-6). Indeed this is the basis of landholding today apart from some abusive transfers to non-frontier communes in the communist period. Regulation extended to hunting and fishing as well as forestry, mining and manufacturing; with the latter facilitated through instruction in spinning, weaving and fulling, and a growth of water-powered cereal mills as well as the first 'joagare' in Maieru and Parva in 1766. Beer and spirits were produced in Năsăud from 1765, paper at Prundul Bârgăului from 1768 while a great lime furnace ('varnița') was built at Parva in 1777. It is also notable that settlement was consolidated so that Nepos was transformed between 1775 and 1783 from a scattered settlement north of the river Someș to a compact linear belt along the main valley. In the same way Budacu de Sus emerged as an expanding nucleated settlement complementing the existing German nucleation of Budacul Săsesc (or Budacu de Jos). New settlement occurred in the heavily forested Ilva valley as colonists moved from Maieru and Rodna to establish dispersed communities at Arșița, Recele and Secături before consolidating under the frontier régime as Poiana Ilvei, Magura Ilvei and Ilva Mare. From the 'mini-basins' along this secondary morpho-hydrographic axis the meadows and forests on the high surfaces could be more fully utilised (Mureșianu 1996).

THE NINETEENTH CENTURY: THE RAILWAY AGE

During this period territorial stability, resting on Habsburg dominance, was consolidated through a secret treaty with Romania, although the 'Ausgleich' (mentioned above) created tension through the re-emergence (albeit within the empire) of a Hungarian nation state within a large multi-ethnic territory. The potential for growth was increased by the end of feudalism in the empire in 1848 (and Romania in 1864) which opened the way for a more unrestrained capitalism as the peasants now found themselves under a more demanding fiscal pressure without the same customary access to forest and grazing land. At the same time, given the capitalistic rivalries of sovereign states, it can be seen that while

the Habsburg Empire-Romanian frontier in the southeast succumbed to the technology of the railway age it also gained an enhanced fiscal significance embarrassing to people who had previously crossed with minimal formality. This review will deal with the developing railway network and the consequences for industry and tourism. It will also argue for a north-south contrast in demographic pressure on land with urbanisation and emigration in the north contrasting with some renewed rural colonisation in the south.

The railway network

The period is dominated by the network's selective growth tendencies in the context of increasing international and inter-regional exchanges. Figure 5 shows that the railway arrived late in the Carpathians. By 1880 there was a continuous system along the outer arc, endorsing the Medieval trade route from Vienna to Brno, Ostrava, Kraków, Tarnów, Černivci, Roman and Galați; but continuing to Bucharest and Turnu Severin. This may be dated as follows: Vienna to Deutsch Wagram (1837); Ganserndorf (1838); Brečlav (1839); Přeřov (1841); Lipník (1842); Bohumin (1847); Czechowice (1855); Dąbica (1856); Rzeszów (1858); Przeworsk (1859); Przemyśl (1860); L'viv (1861); Černivci (1866); Roman (1869); Mărășești (1872) and Buzău (1881) - meeting construction moving north from the chief towns of southern Romania. There was also a 'cut-off' running closer to the mountains which was complete between Hulín (south of Prešov) and Ivano Frankivs'k, running by way of Bielsko-Biała, Sanok and Stryj, by 1888. On the inner side of the arc Vienna was connected with Bratislava, Budapest, Miskolc, Kosice and Satu Mare. But in 1880 the only lines crossing the mountains were in the north from Tarnów to Košice and L'viv to Miskolc and also from Ostrava to Košice and Miskolc and in the south from Oradea, Arad and Timișoara to Cluj, Alba Iulia and Turnu Severin respectively; also from Sighișoara to Brașov to Ploiești. The next forty years transformed the situation especially in the Eastern Carpathians although there remained a wide gap between the lines running south from L'viv to the Tisza at Sighetul Marmăției and crossing the Romanian frontier at Ghimeș west of Bacău. This was a weakness in the First World War when Austro-Hungarian forces were trapped in Bucovina by the Brusilow Offensive because it was only through makeshift arrangements involving a roadside tramway crossing the Carpathians at 1,145m and completed in 1915 - using electric locomotives with petrol engines to work the generators - that equipment could be evacuated through Suceava and Bistrița along a route close to the one that was eventually negotiated by a standard gauge railway only in 1938 (Bellu 2000).

The promotion and engineering of the Carpathian railways, which gave rise to investment on an unprecedented scale, merits a whole study in itself to collate the fragments which have appeared in the epic histories of the pre-World War One period (Turnock 2001). Although the valleys provided obvious routeways their narrowness and inclination was challenging in the context of severe flood hazards. Even with more powerful locomotives available in the later years of the century, curvature and axle load imposed limitations and average speeds were relatively low. The caption for Figure 1 summarises progress with reference to the major trans-Carpathian projects although it begins with relatively local Banat scheme of 1863 (already referred to) which achieved an altitude of 559m at Gârliște and included a remarkable series of viaducts, tunnels and cuttings as well as a shelf on the unstable slopes of the Lișava valley (Perianu 2000). It was a project grounded in the pressures of the Crimean War when the Habsburg authorities

were desperate to get Anina coal to the Danube at Baziaş and contemplated a tunnel ('Tunel lui Stefan') from Colovrat colliery to Lişava as the first stage (Figure 6); although this was eventually completed in 1863 by the private company Staatseisenbahngesellschaft (STEG) that took over the entire state domain of Reşiţa in 1855 through privatisation precipitated by the Crimean War (Graf 1997). Although the coal was subsequently redirected from the Danube to the Reşiţa furnaces, production continued to be taken out over this mountain railway which constitutes the most remarkable part of a sustained industrial endeavour central to the modernisation of the Caraş-Severin district. A cluster of shaft mines developed with connections by narrow-gauge railways and underground tunnels to the central complex by the standard-gauge railway in Anina (Feneşan et al. 1991)

It was 1872 before the railway reached a higher level in the Carpathians. Summit tunnels were by no means uncommon given the steepness of the approaches to most Carpathian passes which horse-shoe bends in side valleys could not adequately address. The Abt rack system was used for a minor mineral line in the Iron Gate Pass in 1908 but was not feasible for principal routes. A remarkable feature of the Carpathian railway system is the steady development which continued to the 1960s for the table lists eight projects in the 1860s and 1870s, five each during the 1880-1899, 1900-1919 and 1920-1939 periods and another three since. This points to the continuing need for cohesion and security within the successor states in the context of numerous 'gap closing' possibilities combined with high construction costs which required careful prioritisation until railways lost their privileged status in 1989. However, some of the lines built in the Habsburg era were little used after the First World War. While the two lines running southwest from L'viv retained a modest service, the line to Sighet via Rakhiv lost the through services provided for Romanians until the Năsăud-Ilva Mică-Vatra Dornei line was finished in 1938 (Ronai 1993, p.361).

Industrial development

The railways attracted industrial development, but in a context of specialisation within the imperial economy as a whole. The authorities were happy to see efficiency enhanced through complementary economic regions whereby the Czech Lands comprised the principal workshop. The 'Ausgleich' gave rise to an enlarged Hungarian industrial establishment but this was concentrated heavily in Budapest. Being peripheral in relation to most of the great cities of the empire, the Carpathians were somewhat disadvantaged. Some light manufactures developed - like the brewery based on the Brzesko estate near Bochnia which has produced Okocim beer since 1845 - but others succumbed to compete with factory production from the major industrial regions. The elites in these backward areas benefited from cheap agricultural labour while ordinary people had the options of migration to the industrial cores or emigration to the United States. But there is an ethnic argument that could be advanced in terms of the disproportionate influence of the Germans and Jews in commerce and manufacturing - and consequently in urban development. The Jews were prominent in the larger towns on the outer side of the Carpathian arc between Bielsko-Biała and Focşani. Their communities often exceeded 10,000 in the late 19th century (22,000 at Černivci) and accounted for 30-50% of the total population (Magocsi 1993). On the inner side the belt of Jewish settlement was more restricted and covered only Prešov, Koşice, Užhorod, Mukačeve and Sighetul Marmăţiei. The Jews were very active in commerce, they also played a key role in the development of industry in Bukovina, especially in food

processing (Moskovich 2001). While the ethnic factor merits further research it is clear that some groups were constrained in their cultural, economic and political advancement and, for example, Romanian entrepreneurs in the empire had limited access to capital until the development of local banks to serve specific ethnic communities.

There were a number of specialised resource-based activities (using coal, oil, iron and other ores - as well as timber). The oil industry impinged on the Romanian Carpathians in areas such as Berca, Câmpina and Moinești; but there were also Galician oilfields around Gorlice, Jasło and Krosno - where exploitation began in 1851 and I.Lukasiewicz distilled oil for the first time, at a laboratory scale (recalled by the petroleum industry open air museum at Bobrka). Progress was facilitated by the 'Inner Carpathian Railway' of 1884 (Żywiec-Nowy Sącz-Jasło-Krosno-Zagórz) mentioned above (Kortus & Adamus 1989). Along with light industry, wood processing and tourism (mentioned below) Galicia found some relief from its post-partition depression. Aside from the Upper Silesian coalfield and its extension to the Ostrava area of Moravia (not covered in detail, although many migrants were attracted from adjacent areas of the Carpathians) metallurgical industries continued in Banat and northern Hungary with the availability of modest coal reserves to effect a transition from charcoal to coke smelting. Indeed an entirely new coalfield was opened up in the upper Jiu valley at Petroșani, expanding rapidly after the railway arrived 1867.

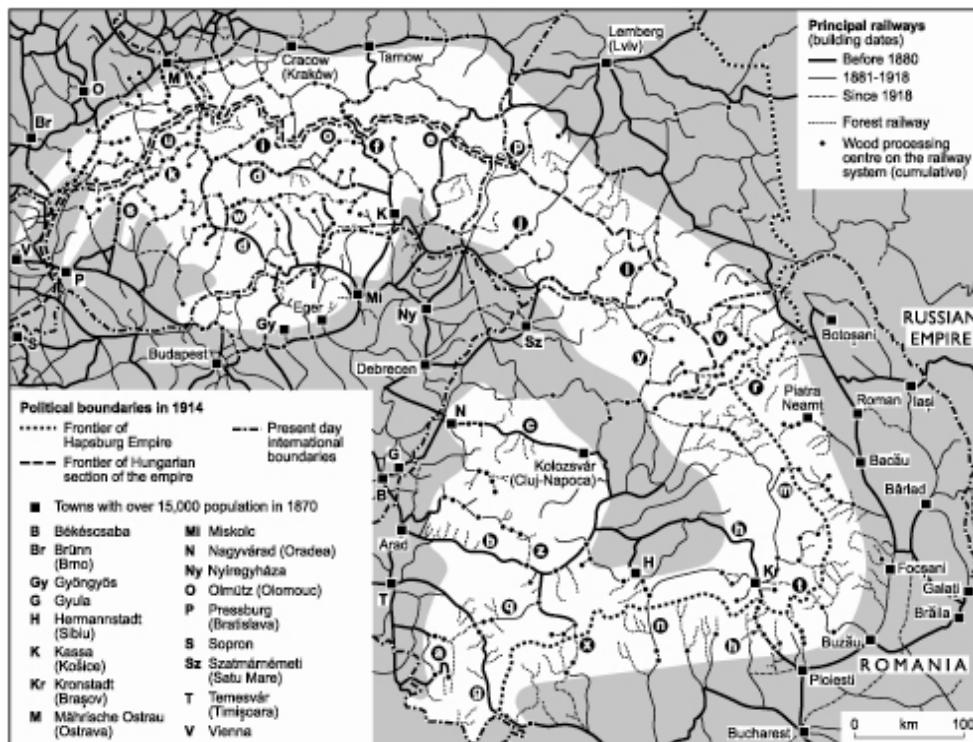


Figure 5: Railway building: 19th and 20th centuries.

Key for the Trans-Carpathian lines a-z (denotes that the railway negotiates a tunnel at the summit):*

a. 1863: Baziaș-Anina reaching 559m* on the Oravița-Gârliște watershed: a coal-carrying railway to supply Danube steamers conceived during the Crimean War, partially opened in 1856 and connected with Timișoara and Budapest in 1858. When the line was cut by the Yugoslav frontier after 1918 there were proposals for links from Oravița to both Moldova Nouă and Orșova; neither of which has been implemented. b. 1868: Arad-Alba Iulia via the Mureș valley (c.200m).c. 1870: Oradea-Cluj Napoca via the Criș-Someș watershed (c.500m between Huedin and Aghireșu).d. 1871: Bohumin to Košice/Miskolc via the Oder (Olse)-Kysuca watershed (553m* at Jablunkov Pass). Also 700m at Poprad at the Váh-Hornád watershed on the Košice line (1872); and 600m in Štubňa-Kremnica area on the Turiec-Kremnica watershed and c.400m at the Slatina-Kriváň watershed east of Zvolen on the Miskolc line (1872).e. 1872: L'viv-Košice via the Oslawa-Laborec watershed (640m* at Lupków Pass).f. 1876: Tarnów to Košice via the Poprad valley (c.500m at Muszyna-Plaveč).g. 1878: Caransebeș-Orșova via the Timiș-Cerna Corridor (515m at Domașnea).h. 1879: Sighișoara-Ploiești via Brașov at the Râul Negru-Prahova watershed (1040m at Predeal). Also c.500m* at Beia on the Târnavă-Olt watershed between Sighișoara and Brașov (1873).i. 1884: Čadca-Žywiec via the Skaličanka-Sola watershed (680m at Skalité-Zwardoň).j. 1887: L'viv-Nyiregyháza via Stryj and the Opor-Vica watershed (1,014m* at Beskid).k. 1888: Brno-Trenčín via Uherské Hradiště(c.300m in the Vlára valley).l. 1895: Ivano Frankiv's'k-Sighetul Marmăției via Rachiv (c.900m at Voronenko-Jasina Pass and c.900m* at the Prut-Black Tisza watershed).m. 1899: Adjud-Ciceu via the Troțuș-Olt watershed (1,025m* at Ghimeș Pass).There was also a plan for Ciceu-Odorhei via Voșlăbeni and the Mureș-Târnavă watershed (1,007m* at Sicaș Pass). n. 1901: Sibiu-Râmnicu Vâlcea via Olt Valley (400m at Red Tower Pass).o. 1904: Nowy Targ-Kral'ovany via Podczzerwone-Trstená (the Dunajec-Orava watershed: 768m at Sucha Hora).p. 1905: L'viv-Nyiregyháza via Sambir, Turka n.Stryjem and Vel.Bereznij: (859m at Užocka Pass on the San-Už watershed).q. 1908: Subcetate-Caransebeș via Hațeg and the Râul Mare-Bistra watershed (892m at the Iron Gate Pass): 'linia cu cremaliera' using the Abt rack system for 1 in 20 gradient. This east-west connection was extended beyond Caransebeș to reach Reșița in 1938 from where a railway (developed between 1858 and 1892) extended to Timișoara.r. 1915: Vatra Dornei-Tiha Bârgăului at the watershed between the Moldavian Bistrița and Transylvanian Bistrița (c.1100m south of Tihuța Pass). This was a wartime project using petrol-electric locomotives, repaired in 1922 for peacetime use in Romania. Connected eastwards by the Bukowiner Lokalbahn from Dărmănești: reaching 528m at Strigoaia on the section to Vama (1888); then 1,099m at Mestecăniș Pass on the extension to Vatra Dornei (1902). The Vatra Dornei-Dornișoara section was retained when the rest of the line replaced by project 'u' in 1938.s. 1929: Veselí nad Moravou-Nové Mesto nad Váhom via Velká nad Veličkou on the Teplica-Myjava watershed (400m* at Myjava).t. 1931: Brașov-Întorsura Buzăului reaching 700m* at Teliu Tunnel breaching the Târlung-Buzău watershed. This was meant to be the start of a line between Brașov and Buzău which was discontinued due to the unstable terrain of the Buzău valley. It was one of several projects to overcome the limited capacity of the Prahova valley line. Other options were Sinaia-Pietrosița - listed in 1913 but not proceeded with (Turnock 2001 p.139) - and Curtea de Argeș-Râmnicu Vâlcea, virtually complete in 1989 but subsequently abandoned due to lack of finance and reduced railway traffic, though included in projects for EU ISPA accession funding as part of the TINA programme.u. 1937: Ostrava-Púchov via Vsetín (528m in the Lysky valley).v. 1938: Năsăud-Vatra Dornei via Ilva Mică (on the Ilva-Bistrița watershed: 874m at Grădiniță Pass).w. 1939: Prievidza-Košice via Banská Bystrica (c.600m* on the Štubňa-Harmanec section on the Handlová-Teplica watershed). The whole project involved Prievidza to Handlová (1913); Štubňa at 600m* (1931); Harmanec at c.600m (1939); Banská Bystrica (1913); Podbrezová (1884); Brezno nad Hronom (1895), Červina Skála (1903); Mníšek n.Hnilcom, reaching 900m* at the Hron/Hnilec watershed (1936); Margecany (1884); Kysak (1872); and Košice (1870).x. 1948: Simeria-Târgu Jiu via the Jiu defile (c.700m at Bănița), though this highest level was actually reached in 1870 on the Strei-Olt watershed when the Petroșani branch was completed.y. 1948: Salva-Vișeu via the Iza-Sălăuța watershed (682m* below Șetref Pass); part of a through line from Brașov to Sighetul Marmăției which reached 882m at Izvorul Mureșului, south of Gheorgheni (1907) and c.600m* on the Deda-Sărățel section (1942).z. 1979: Arad-Brad-Deva (c.350m* at Vălișoara on the Criș Alb-Mureș watershed); part of a plan for a railway link between Oradea and Deva that would have reached 500m between Vașcău and Brad on the Criș Negru-Criș Alb watershed.

Population rose from 10.1 thousands in 1857 to 16.0 in 1880 (2.63% annually) and then 47.2 in 1910 (6.52%). While the coal was not of good metallurgical quality it contributed to the expansion of ironworking in the Poiana Rusca Mountains with charcoal furnaces at Ruschița (1828) and Rusca Montană (1830) followed by coke smelting at Călan in 1863 and more particularly at Hunedoara where five furnaces were built during 1882-1903. Both Reșița and Hunedoara attracted labour from the immediate mountain areas and from depressions such as the Timiș-Cerna Corridor and Hațeg. The whole area from Hațeg through Hunedoara and Călan to Deva and Simeria witnessed growth from 26.5 thousands in 1857 to 30.4 in 1880 and 43.7 in 1910.



Figure 6: The Anina Coalfield

While Hunedoara's pig went to Budapest, the Reșița area acquired its own steelmaking capacity from 1868 (Manolescu et al. 1996), with engineering industries in Reșița itself and also in outlying settlements like Bocșa (Perianu 1996). The whole of the

former state domain, now managed by STEG, had a population of 76.1 thousand in 1880 rising to 88.5 in 1910: probably the largest industrial complex in the Carpathians and equivalent to Hunedoara and Petroșani together. Meanwhile progress in northern Hungary arose when coal mining and metallurgical interests were combined through the Rimamurány-Salgótarján company in 1881 and the inherited foundries at Borsodnadasd, Ózd and Salgótarján were supplemented by steelmaking at Ózd and finishing at Salgótarján. Non-ferrous metals were also of much interest especially the gold and silver mines served by smelters in Baia Mare and Zlatna. While there was much investment in the former during the era of 'Direcția Minelor Baia Mare' (1864-1918) including factories for chemicals, electrolytic copper and lead in the Baia Mare-Cavnic area (Bălănescu et al. 2002), the Roșia Montană area was remarkable for its opencast working based on peasant family units; each working a small concession of a few square yards. The processes of blasting, extraction, crushing and transport (to Abrud) "are carried out in the rudest possible manner [with] no less than 500 crushing mills and washing floors within the space of a couple of English miles" (Paget 1850, p.299). Some peasants collected ore lying on the pathways where it was found "glittering in the sun" after some natural sorting of material on the stony surface by rain; showing that the dream of "streets paved with gold" was no idle romance but "a serious reality" (Ibid, p.300). Some modern machinery was introduced into underground mines by the end of the period but the peasant interest persisted into the interwar era.

Reference should also be made to modern water management made an impact through reservoirs and the first generation of hydropower projects. At Sibiu a new 'Canalul Școala de Innot' served the military school and hospital and further rationalisation of canals in 1879 gave rise to a park where there had previously been a lake and sawmill. The arrival of the first long distance water conduit of 1894 meant that all the local streams lost much of their importance for water supply and more former lakes could now be used for open space (though lakes were retained for fish in the upper part of the Cișnădie stream in Dumbrava) (Hațieganu 1942). Several hydropower projects were undertaken because, although technology and capital resources restricted development to small projects to meet industrial needs, a rhythm was maintained from the Caransebeș project of 1889 (70Kw), by a local mill owner; to Băile Herculane (1892, 130Kw) for the local spa; Topleț (1893, 80Kw) for local mills; Petresti (1894, 110Kw) for the paper mill; and Baia Sprie (1895, 140Kw) and Cavnic (1900, 80Kw) for the Baia Mare mining area. Sadu (1896, 185Kw) provided for the Italian Fetinelli company's Talmaciu sawmill; while three units concerned with the Hunedoara iron industry - Govăjdia (1896, 200Kw), Cățanaș (350Kw, 1897) and Hunedoara (1897, 420Kw) - and the Oțelu Roșu ironworks secured 320Kw of capacity in 1898 followed by Meanwhile in Romanian territory Cămpina (1897, 200Kw) served the oil industry; Sinaia (1898, 250Kw) was needed by the local resort. The paper mills of Letea and Bușteni were endowed in 1898 (100Kw) and 1899 (24Kw) respectively (Pop 1996, pp.12-30). Among the projects undertaken after 1900 Reșița provides perhaps the most interesting example since canalisation of the Bârzava valley gave rise to an efficient system of canalised timber transport as well as a 1.8MW power station at Grebla on the edge of the town (Hillinger et al. 2001).

The Logging Industry was greatly facilitated by the main line railways and also by light, narrow-gauge forest railways - usually built by the logging companies - which are also shown on Figure 5. The distribution is very uneven on account of an overriding interest in resinous timber like fir and spruce, rather than beechwood. Hence northeastern Hungary

(north of Satu Mare) has very few such railways in contrast to the well-developed system across the watershed (based on sawmills south of Stryj and around Suceava in Bucovina). Generally the forest railways penetrated tributary valleys to heights of 1,000m. Systems might branch to serve several minor valleys in the upper reaches of a particular basin or they might wind across low watersheds as in the Topol'čany area of western Slovakia. Where the resinous timber was high above the beechwoods it could be feasible to reach over the main watershed especially when the infrastructure was better developed on one side of the mountains than the other: funiculars were often installed where watersheds had to be crossed (or inclined planes in the case of the Comandău system in Covasna) (Turnock 2006, pp.107-11). Gradients would normally be in favour of the loaded wagons, typically moving down-valley, and there is a tradition of gravity working in some areas. The forest railways around Anina were complicated by winding trajectory to cross the watershed between the Gârliste and Miniş valleys but the sawmill in the Miniş valley (at Carşa) was rationally located at a point where timber from all directions would descend by gravity and only sawn timber would then have to be taken out against the gradient to Anina.

But valleys with steep profiles might pose insuperable operational problems and favour retention (despite considerable raw material losses) of timber floating systems organised with the help of wooden barrages to store water to deal with sections of limited depth. When Germans from Baden founded Colonia Bistra in 1870 to supply the Petreşti paper factory from the virgin forests of the Sebeş valley, a 'stavilar' was installed to improve the floating downriver while a further dam ('zagaz') at Oaşa Mare accelerated the deforestation of the upper valley. Alternatively, funiculars might extend from neighbouring valleys e.g. from the upper Lotru to the Sadu valley and Tălmăciu. Where the valleys were extremely circuitous such as the route down the Walosaty and San valleys in the Bieszczady area (Galicia) to join the main L'viv-Užhorod railway south of Turka it was possible with some simple earthworks to shorten the distance considerably by using minor valleys while maintaining a level or gradual downhill gradient for loaded wagons. The drawing of the Polish-Soviet boundary after 1945 so as to leave the main line in the then USSR effectively cut this line of communication. Meanwhile the Wetlina area remained in touch with the Sanok-Humenné line at Łupków although the section between the Solinka and Oslawa valleys involved a minor deviation into Czechoslovak territory.

The local impact of the logging industry can be gauged from Nixon (1998, pp.276-7) who mentions a sawmill at Reghin in northern Transylvania in 1879 producing 170,000cu.m/yr by 1905 when a narrow-gauge forest railway was opened to bring timber from the Lapuşna area of the Giurghiu valley (though the traditional rafting and floating systems continued on a small scale despite damage to river banks). The railway was a force for modernisation since it was used for passengers as well as freight and tourists began to penetrate the valley, especially with hunting in mind. The tourism function can also be seen on the forest railways from Curtea de Argeş, Măneciu, Zărneşti and Zăvoi to Cumpăna, Cheia, Plaiul Foii and Poiana Mărului respectively. As the forests were opened to exploitation, permanent settlements and services (including tourism) appeared over much of what was previously a pioneer fringe (Turnock 1991a, p.57). Giurcăneanu (1988) has related local settlement hierarchies to the forest railway morphology: noting the principal nodes where the sawmills and transfer points are situated; the hamlets at main junctions and collecting points; and outlying cottages, forestry cabins and hunting lodges on the periphery. As an example Velcea (1964) mentions the branch railway to Bixad-Oaş which encouraged expansion of the mineral water industry by the Radak and Szentivany families

from 1902, followed by sawmilling in Bixad in 1910 thanks to a web of forest railways to Valea Lechincioarei, Valea Talnei Mici (Băile Puturoasa) and Valea Tribșorului.

The enhanced value of woodland meant further limitations on shepherding in Moravia and elsewhere. Although the abolition of serfdom in 1848 gave shepherds ownership of land, they received only a small proportion of what they had previously used, while the remainder passed to the former landlords who established woodland monocultures at a time when the economics of sheep farming were undermined by competition from Australian wool. Traditional shepherding went into retreat and disappeared from Moravia before the onset of communism. Meanwhile, the value of timber gave an incentive to plant unproductive land as was the case around Sibiu in the late 19th century when pine forests were established at Gura Râului, Orlat, Rășinari and Tilișca. But at the same time, the older forests were substantially restructured. Large clearcuts were generally restocked with spruce to the extent of 95% (with some larch and Douglas fir), at the expense of beech and oak, while the average age of the woodlands decreased sharply. There was also a tendency in the 19th century to use seed of foreign provenance (mainly Austrian) to restock bare lands after wind and insect calamities (Voloscuk 1998). The same tendencies to monoculture have been reported from Ukraine since c.1750 with the decrease of beech from 54.9 to 33.0% (and oak and related woods from 13.3 to 10.1%) and the increase of fir-spruce from 31.8 to 55.9%. With heavy logging since the late 19th century, perpetuated in the communist period, 40.9% of the forests now comprise saplings and 30.9% are middle-aged, while only 28.2% are mature or are approaching this condition. These trends contributed to pressure for nature conservation. Slovakia's first nature reserve (Ponicka Huta) dates to 1895 and provided an inspiration for the 'zapovedniki' which are areas strictly protected for scientific and educational purposes, with recreation prohibited.

Tourism

The historic over-development of Carpathian valleys continued, especially when the railway imposed heavier land use pressures and contributed to the dissemination of alien species linked with modern transport. The end of feudalism brought greater fiscal pressure with excessive stocking of common grazings. Pressure was relieved by emigration and significant urban development - albeit modest by lowland standards - especially in the foothills and along the main trade routes where local servicing was boosted not only by local manufactures but also by tourism, for industrial pollution was quite localised and did not seriously constrain the growth of spa tourism (or lesser interests in hunting, rambling and winter sports). In Galicia, greater administrative autonomy at the end of the 19th century was reflected by 'art nouveau' most evident in fashionable spas like Krynica (a borough in 1889) and Szczawnica in the Pieniny, which drew great benefit from belated rail access in 1911 after the Hungarian Szalay family had first bought the estate in 1834 and developed the landscape park and local housing. In the Low Beskids, Iwonicz was founded in 1839 and gained a reputation for the treatment of rheumatic, digestive and respiratory disorders. Other examples included Rymanów and Wysowa; the latter developing out of a 15th century Wallachian village and a centre of the wine trade with Hungary. Rabka in the Beskid Wyspowy also developed as a spa in the late 19th century with access to waters containing sodium and chlorine. And when Ustron's iron industry was eclipsed by Třinec (Ostrava) the watering function came to dominate with official recognition of the spa in 1882.

The outstanding case is Zakopane where promotion for tourism arose in the 1870s through the combined efforts of local personalities associated with the society named 'Towarzystwo Tatrzańskie' 1873: T.Chałubiński (physician), M.Karłowicz (composer and mountaineer), J.G.Pawlikowski (writer and theatre director), W.E.Radzikowski (artist), J.Stolarczyk (Catholic priest), K.P.Tetmajer (poet) and S.Witkiewicz: the architect who created the 'Zakopane style': blending with the 19th century church and traditional wooden buildings in contrast to the architecture of the other leading resorts of Galicia. Initially a health spa in 1886, Zakopane became an important centre for mountain expeditions (Turnock 2006, p.136) and it was also the birthplace of Polish skiing with the formation of the skiing association in 1907 ('Sekcja Narciarstwa') and provision of a voluntary mountain rescue service in 1909. It was also seen as a cultural centre and symbol of Polish national unity pre-1914. Moreover in 1889 the entire estate became the property of Count Zamoyski who eventually (1924) established a national foundation leading to the present Tatra National Park. Meanwhile, the spa system extended through the Eastern Carpathians (Cianga 1994). There was Truskavec in Ukraine where therapeutic spring waters were first recognised in the 16th century. The first hydropathic institution (comprising eight cabins) was started in 1827 by T.Torosiewicz, a L'viv doctor-chemist-pharmacist from an Armenian family, who analyzed the spring waters. Interest increased with oil boom nearby at Boryslav. The overhaul in 1911 - with provision of new lodgings and pavilions by a local company headed by an entrepreneur from nearby Drohobyč who became council chairman - anticipated the opening of a branch railway from Drohobyč on the Sanok-Stryj section of the Inner Carpathian Railway (1872) which served nearby Boryslav in the same year.

Rail transport of course was all-important for development on a fairly large scale, with a surge in business typically correlating with the arrival of the railway at places like Călimănești and Slănic-Moldova in Romania, although Băile Herculane in Banat had the advantage of proximity to Danube steamers at Orșova. However such might be the reputation of the 'cure' at a particular spa that quite difficult journeys might be undertaken. At Borsec in eastern Transylvania where carbonaceous waters were first discovered by a hunter in the 15th century - and their curative properties were validated in Vienna in 1777 soon after a military presence was established in 1762 - a lease was obtained in 1805 and mineral water was distributed in bottles manufactured from local silica. But there was modest patronage by visitors even before the railway age, leading to a proper balneary establishment in 1873 when local peat and lignite were used to heat water for baths taken in wooden tubs. But even when the railway reached Reghin from Târgu Mureș in 1886 patients still faced a journey of some 85kms by coach ('diligența') - the same distance from Miercurea Ciuc where the railway arrived in 1897 - with the alternative of a slightly shorter 66km haul from Piatra Neamț in Romania which gained a rail service in 1885. The road journey was reduced to 20kms after a railway reached Toplița in 1909, with the option circuitous onward journey of 40kms the following year by narrow gauge forest railway which went most of the way (and was later extended to the spa itself). A specially designed railcar was provided in the communist period until a local bus service took over. Meanwhile hunting was attracting a select, wealthy clientele and was exerting an influence on land use in some remote areas: for example in the Retezat where pastoralism was reduced (Bucura 'stâna' was abandoned in 1906) when Hungarian landowners refused to rent pastures so as to keep the land intact for hunting bear and chamois (De Martonne 1922, p.133).

As Ford (2002) has explained there was a growing interest in the Carpathians as travellers from the more industrialised parts of Europe took advantage of the comforts of rail travel to reach a distant mountain region and escape from modern civilisation in an area where the 'glamour of the Middle Ages' still lingered. The Carpathians also provided an antidote to the all-too-familiar Alpine landscapes, with "the deficiency in height compensated by the character of the scenery" (Ibid, p.56). Some thought the Carpathians 'too melancholy', but the rural fantasy offered by the 'surrogate Alps' was widely appreciated for the relative lack of sophistication and while Kraków was a common point of entry to the mountains, the Transylvanian setting for Bram Stoker's 'Dracula' novel drew attention to the Hungarian railway system since the story seems to have been cast at the furthest outpost (at the time) of the network extending east of Budapest to the Bistrița area. Tourism contributed to a better understanding of the ethnic characteristics of the region that were all too easily overlooked by the cultural manifestations of the leading national groups. Franz Jozsef's tour in 1880 included a visit to the Kolomyja ethnographic exhibition on 'the Hutsul region'; organised by the Tatra Society which expanded from its Zakopane base through branches in both Kolomija and Ivano-Frankiv's'k providing chalets and trails in the mountains including an 'Alpine base camp' in the Hutsul village of Żabie (Verkhovyna). Subsequent development of tourism boosted demand for Hutsul handicrafts and helped to sustain a group increasingly dependent on Jewish moneylenders and Armenian cattle dealers following the end of feudalism. At the same time there was evidence of a hidden agenda as Polish nationalists 'claimed' the Carpathian groups emerging in the ethnic borderlands; first evident when the Warsaw Poles embraced the Gorale Highlanders and diffused the 'Zakopane style' diffused as their own (Dobrowski 2005).

The rural impact

Although direct railway access conferred clear economic advantages, the forces of modernisation were extended by feeder roads with postal and telegraph services underpinning each local administrative centre. These centres attracted a range of services and private businesses As Nixon (1998, p.219) points out in the case of the Giurghiu valley near Reghin in northern Transylvania, Giurghiu village emerged as a central place, since it was historically the key village of the estate, although a military road extended formal local government a little further up the valley to Ibănești. Such villages would often act as surrogate towns with their markets, handicrafts and small professional communities; noted in monographs dealing with Baia de Fier in Oltenia and similar places that showed some dynamism from the turn of the 19th century. And since the towns were becoming more important in the economic and cultural senses, the 18th century phenomenon of 'roire ascendente' may have lost much of its momentum by the end of the century as pressure to grow crops on the high ground was relaxed and terracing systems lost some of their importance (Opreanu 1942; Pacurar 1997). As pressure on the land was relaxed and erosion was reduced, there was a transition back to woodland via juniper bushes evident in the Jasiołka, Osława and Wisłoka catchments of the Polish Carpathians and it is evident from a map of 1851 how forest replaced the former open fields of Lipowiec (Lac 2000).

Partial re-afforestation from the late 19th century also occurred in areas of 'kopanitse' settlement in Moravia and Slovakia (Huba 1989), recalling the stake of the Wallachian shepherds in the northern Hungarian borderland in general and the 'Valassko' country of the White Carpathians in particular. Distance from timber markets had

previously delayed intensive forestry and given the pastoralists a greater stake in the land so that landlords allowed the high surfaces to be taken over by shepherding so as to support permanent settlement - with organic manure to support crops on considerable areas and not simply symbolic patches of vegetables and cereals in a well-fertilised 'kosar' where sheep were stockaded and shepherds built their shelters. However the land had become excessively gullied and subdivided by three centuries of colonisation (Stankoviansky 2000). Further erosion of the old system was to occur in communist times when cooperative farms levelled the steps of terraced fields and eliminated many linear landscape elements. But a study of hill land at Myjava in the Jablonka catchment has reconstructed much of the old cultural landscape and correlated the gullies with headlands, tracks and lynchets while the Wallachian ethos can also be recalled through the open air museum at Rožnov pod Radhoštěm in Moravia.

However, the freedom from the necessity of growing subsistence crops was only a blessing where labour could be redeployed through commuting to work in industry and services. The contemporary problem of the Carpathians, which started to be felt in the 19th century, lay in the lack of sufficient non-agricultural employment for agriculture to switch more comprehensively from subsistence to specialised livestock rearing farms (Kurek 1984). Pressure on land resources remained strong in the south, for in 1905 96.8% of all people owing land in the mountains of Romania (pre-1918 frontiers) had holdings averaging only 2.8ha, with additional problems of fragmentation into units of 0.6ha. There was continued subdivision and fragmentation of farms in some areas with subsistence farming for wheat and rye, supported by heavy manuring. Romanian smallholders sought grazing for livestock and sold wood whenever possible to obtain additional income and, in contrast to Moravia, traditional shepherding continued as before in the Carpathians of Romania and Transylvania. In the Subcarpathian hill country of Romania where steeply dipping sandstones and clays gave rise to landslides and mudflows peasants appreciated the potentials of relatively immature, humid soils for maize, potatoes and plum trees which provided subsistence crops and a source of brandy that could be marketed along with surplus animals. Oral evidence suggests that in the Pătârlagele area the microlandscapes of peasant farming accentuated the tendencies towards dispersal as the colonisation of the more stable landslides reached its peak in the 19th century in response to a growing population and an expansion of capitalist farming on the lower terraces. Figure 7 shows a remarkable number of settlements that originated at this time: many of them quite small but taking advantage of sites that were problematic for housebuilding but attractive in offered a range of potentials (for cropping, grazing, haymaking and fruit growing) appropriate for subsistence farming and pluriactivity (N.Muică et al. 2000). Some peasants emigrated while others found work in the lowlands on a permanent or temporary basis. Thus people from Paltin and Tulnici in Vrancea went to Dobrogea after 1878 when this Black Sea province came under Romanian administration.

Census information is difficult to collect for the Carpathians as a whole but fortunately the Hungarian census of 1910 was reorganised on the basis of the present communes and counties in preparation for the Romanian national atlas (though the raw data has not been published) while the earlier data for 1857 and 1880 was subsequently dealt with along similar lines (Rotariu et al. 1997a, 1997b) although the former does not cover Banat, Crişana and Maramureş. The results are presented in Table 1. For the whole area the population was 2.25mln in 1880 and grew by 0.72mln (1.07 percent annually) to 1910 and although the rate in the towns (including incipient towns i.e. those declared over the period

1910-1995) was relatively rapid (1.71%) the rural areas still witnessed a substantial growth of 398.8 thousands: 0.82 percent annually). Bearing in mind the east-west gradient in natural increase evident in the communist period it is remarkable to see the picture reversed during 1880-1910 when the annual growth of 1.12% overall (1.86 for the towns and 1.02 for rural areas) for Banat etc. compared with 1.13 (1.99 and 0.73) for West Transylvania and 0.76 (1.10 and 0.65) for the East. Plainly the towns were not absorbing the surplus – indeed they saw less growth in absolute terms (322.8 thousands) than the rural areas - and although some of the highest rural growth rates fell to heavily forested districts that were being opened up for commercial exploitation like Gura Râului (Sibiu) and Lunca Bradului (Mureş) there was still a growth of subsistence pressure. During 1857-1880 the growth was more moderate: 0.37% annually across Transylvania – again higher in the towns (0.74) than the rural areas (0.24); again with higher rates in the west – 0.42 (0.89 and 0.23) – than the east: 0.32 (0.53 and 0.25). The rural areas gained 50.3 thousands - slightly less than the towns with 58.4 – and again west Transylvania registered a faster growth (0.42% annually) than the east (0.32).

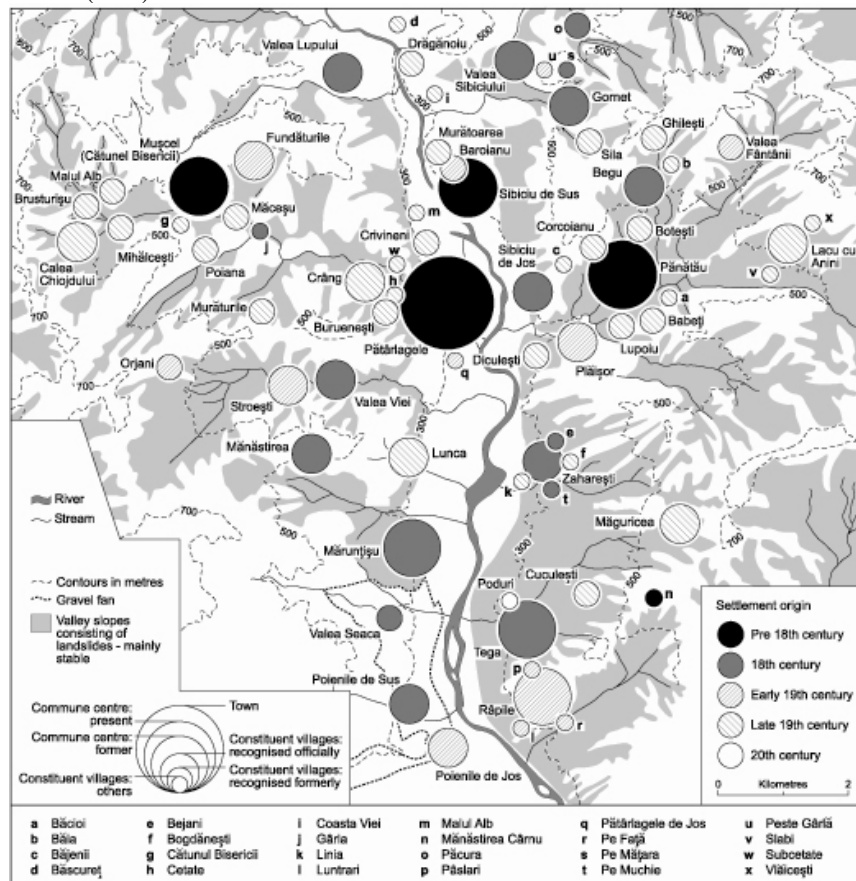


Figure 7: Settlement history of the Pătârlagele area of Romania's Curvature Carpathians

Table 1: Population Trends in the Carpathians of Banat-Crişana-Maramureş and Transylvania: 1857-1880 (One) and 1880-1910 (Two)

Period	Initial Population			Absolute Growth			Annual Rate Percent		
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
BANAT-CRIŞANA-MARAMUREŞ									
Arad County									
Two	25936	146766	172702	6791	40877	47668	+0.87	+0.93	+0.92
Bihor County									
Two	55134	130909	186043	40036	68398	108434	+2.42	+1.74	+1.94
Caraş-Severin County									
Two	60324	192290	252614	14890	32754	47644	+1.07	+0.57	+0.63
Maramureş County									
Two	70130	107913	178043	54758	34308	89066	+2.60	+1.06	+1.67
Satu Mare County									
Two	2771	24585	27356	1446	8535	9981	+1.74	+1.16	+1.22
Timiş County									
Two	12389	52302	64691	8573	14888	23461	+2.31	+0.95	+1.21
Total									
Two	226684	654765	881449	126494	199760	326254	+1.86	+1.02	+1.12
TRANSYLVANIA-EAST									
Bistriţa-Năsăud County									
One	14563	59946	74509	3190	9996	13186	+0.95	+0.72	+0.77
Two	17753	69942	87695	7178	23274	30452	+1.35	+1.12	+1.16
Braşov County									
One	65091	122610	187701	4780	-3116	1664	+0.32	-0.11	+0.04
Two	69871	119494	189365	12116	18175	30291	+0.58	+0.51	+0.53
Covasna County									
One	24764	100461	125225	2974	-196	2778	+0.52	-0.05	+0.10
Two	27738	100265	128003	14584	4060	18644	+1.75	+0.13	+0.49
Harghita County									
One	28908	114214	143122	5219	14385	19604	+0.78	+0.55	+0.60
Two	34127	128599	162726	16855	28238	45093	+1.65	+0.73	+0.92
Mureş County									
One	10049	36606	46655	1501	3917	5418	+0.65	+0.47	+0.50
Two	11550	40523	52073	2402	15188	17590	+0.69	+1.25	+1.13
Total									
One	143375	433837	577212	17664	24986	42650	+0.54	+0.25	+0.32
Two	161039	458823	619862	53135	88935	142070	+1.10	+0.65	+0.76
TRANSYLVANIA-WEST									
Alba County									
One	56778	133994	190772	5526	8764	14290	+0.42	+0.28	+0.33
Two	62304	142758	205062	24077	22921	46998	+1.29	+0.54	+1.06
Cluj County									
One	37418	74841	112259	15654	8659	24313	+1.82	+0.50	+0.94
Two	53072	83500	136572	36374	31240	67614	+2.28	+1.25	+1.66
Hunedoara County									
One	47247	171234	218481	10916	5963	16879	+1.00	+0.15	+0.34
Two	58163	177197	235360	51653	27556	79209	+2.96	+0.52	+1.12
Sălaj County									
One	10258	45104	55362	2138	5263	7401	+0.91	+0.51	+0.58
Two	12396	50367	62763	4366	16680	21046	+1.17	+1.10	+1.12
Sibiu County									
One	47943	53934	101877	6524	-3375	3149	+0.59	-0.27	+0.13
Two	54467	50559	105026	26742	11728	38470	+1.21	+0.77	+1.00
Total									
One	199644	479107	678751	40758	25274	66032	+0.89	+0.23	+0.42
Two	240402	504381	744783	143212	110125	253337	+1.99	+0.73	+1.13
TRANSYLVANIA-TOTAL									
One	343019	912944	1255963	58422	50260	108682	+0.74	+0.24	+0.37
Two	401441	963204	1364645	196347	199060	395407	+1.63	+0.69	+0.97
CARPATHIAN REGION-TOTAL									
Two	628125	1617969	2246094	322841	398820	721661	+1.71	+0.82	+1.07

Sources: Rotariu et al. 1997a (1857 census), 1997b (1880 census) and files held by the Romanian Academy (1910 census)

The 1857 census included data on the number of people absent from home at the time of the census and the picture shows a higher rate for the towns (45.3 persons per thousand) than the rural areas (27.3): 32.2 overall. There is also a higher rate for the east (55.8) than the west (37.7) which applies to both urban areas (35.4 against 20.1) and rural areas (40.5 against 25.3). However in some localities the rates were extremely high - 191.5 for the Bran district of Braşov, 117.0 for the Sălişte district of Sibiu and 90.1 for the town of Braşov - while in many other areas the rates were insignificant. We therefore have a picture of local 'highs' in terms of absence in connection with trade or transhumance pastoralism compared with near-total dependence on local subsistence elsewhere. Low growth during 1857-1880 could then have arisen in part from the breakdown of long-wave transhumance and the migration of 'Ungureni' across the Carpathians to Wallachia: a migration continuing from the 18th century but always difficult to quantify (Popp 1942). However whereas 1857-1880 saw 28 of the 99 rural districts lose population (13 in the east of which 12 were in Braşov and Covasna counties; and 15 in the west - mostly from Hunedoara and Sibiu counties) there were only six cases for 1880-1910; while conversely there were 34 growing annually by 1.0 percent or more in the later period compared with only 12 in the first period. There is no space to discuss the census results further but they provide a context for the following case study.

The Romanian Carpathians: Mărginenii Sibiului. The scale of adjustment made by peasant communities is well exemplified by this district when long-wave transhumance encountered restrictions in Dobrogea in 1865, followed by some severe winters in the 1870s, particularly in 1875. Tighter border controls prevented entry to Bulgaria in 1879 and the customs wars between Romania and the Habsburg Empire broke out during 1885-91 when Romania's interest in protecting domestic industry affected her agricultural exports and resulted in less favourable border regulations. Some shepherds moved on in the 1870s and 1880s to work seasonally in Bessarabia with the flocks of large landowners - travelling via Bistriţa and Bucovina, while returning with payment in wool (for use in the textile industry at home) via a more circuitous route via L'viv, Debrecen, Oradea and Cluj to avoid Romanian customs duties by passing directly from Russian to Habsburg territory. But wool roads ('drumul lânii') such as the one through the Troţuş valley and Braşov provided the opportunity of picking up salt on the way. Some pastoralists pushed on to the open spaces of Crimea and Caucasus (heading eastwards from Sulina) for a more congenial environment avoiding the hard winters and dry summers in Bessarabia and reaping good profits for a ten year absence from home.

Another late 19th century strategy was to give up sheep rearing and turn to itinerant peddling ('comerţ ambulant') selling locally-produced goods - and others too - along the familiar routes: northeastwards through Transylvania to Târgu Mureş, Bistriţa, Suceava and Černivci and Bolgrad; eastwards through Braşov and the Oituz Pass to Tecuci and thence towards the Black Sea coast via Galaţi and Ismail or else to Chişinău and Tighina; southwards to the Danube at Turnu Severin, Calafat or Turnu Măgurele (following the river downstream to Cernavodă in the latter case); or southeastwards through Piteşti to Bucharest. They also set up as craftsmen and traders in the towns of southern Transylvania or northern Wallachia and in several rural areas around Bistriţa and Târgu Mureş in Transylvania, Slatina in Oltenia and further east around Brăila, Galaţi, Huşi and Tulcea (Dragomir 1925; 1938). While the women did not normally go beyond the limits of Transylvania, the men would travel down the Olt valley to the Danube, perhaps with 60-70 carts setting off at the same time. Meanwhile at home there was more intensive pastoralism

at home based on an increased hay harvest, along with cultivation up to 900m at Jina, Rod and Poiana Sibiului - which required some terracing on sloping land (especially north of Poiana Sibiului) - and diversification into fruit growing. There was also some potato growing at 1,300m around shepherds' huts and, despite some deforestation, the forest economy (based on beech and spruce) was important, as were local handicrafts. Buza (1974) refers to a paper industry operating at Orlat during 1821-59.

The textile industry was already large in view of the wool that was usually taken home as part of the transhumance routine, but the scale of the production increased and the Domnariu business in Săliște had 40 workers supplying clothing to Transylvania and Romania. The use of water power reached the highest levels with sawmills, fulling and wash mills ('pive' and 'vâltori' respectively) and cornmills totalling 65 at Gura Râului with 10-20 at Orlat, Rășinari, Rod, Sadu and Tilișca. Food processing was established at Orlat and Tălmăciu. By the end of the century those (usually small) villages without supplementary non-agricultural resources were in decline. However, the domestic textile industry became a victim of more stringent customs regimes which forced the Mărgineni to disperse. Many moved into Transylvanian towns, such as Hațeg and Petroșani, but others crossed the frontier to settle along the traditional transhumance routes such as those extending to Bessarabia from Falciu, Galați and Suceava. Some found their way to Dobrogea and even into the Russian Empire during the depression caused by the Customs War of 1885-91 while a few were able to emigrate to the United States. Oltenia (just across the mountains) was a popular destination, especially since water power could be harnessed in such places as Novaci, Polovragi and Vaideeni, and some migrants set up businesses in the town of Râmnicu Vâlcea. This helped to perpetuate the colonisation by 'Ungureni' evident over the previous two centuries (Metes 1977). Those who settled in Romania generally remained in their adopted settlements after unification.

CONCLUSION

Until the 19th century there was no catastrophic alteration of ecosystem in the Carpathian foothills of Galicia: "changes were natural which means that the effects of the climate, relief and water conditions dominated over the anthropic factors" (Pietrzak 2000 p.213). But in the 19th century there was a great increase in pressure with a heavier density of population (82/sq.km) than in Poland as a whole (27); compared with just 21 in 1500, which was then below the national average! Uniform exploitation of all natural resources made for accelerated environmental transformation, although not on the same scale as the population increase (given the urbanisation process), yet nevertheless even in the Polish Carpathian foothills more intense pressure by peasant farmers - whose lives remained relatively untouched by urbanisation - meant further deforestation which raised the timberline in the Tatra quite noticeably during the 19th-20th centuries. Until a methodology of this kind is extended to all parts of the Carpathians this analysis is of limited value. But it is clear from the evidence presented that agricultural pressure was responsible for erosion in several areas (as noted in the White Carpathians) and while the peak appears to have been passed in the northern part of the mountains by the First World War there was still an expanding rural population in Romania which gave rise to further deforestation at the end of the 19th century and increasing risks in terms of damage by floods and landslides. This also applies to parts of the Habsburg Empire, like the Apuseni: for although there was

planting in the Ampoiu, Arieș and Criș catchments to protect drainage basins this was insufficient to balance the heavy cutting by local peasants - some 50,000ha during 1870-1910 in order to produce wooden manufactures and secure more agricultural land (C.Muică et al. 1999). At the same time, the increased value of woodland through commercial exploitation went hand in hand with species change that was potentially destabilising. Fortunately there were measures being taken in response to these dangers and such interventions increased during the 20th century but not with sufficient impact to safeguard biodiversity to an acceptable level. However urbanisation seems to have broken the link between overall population growth and environmental transformation; something that was all too evident in the 19th century when heavy pressure for subsistence was increased by the capitalist logic of maximising growth for the market on the better land. And the losses incurred through flooding along with the devastation of forests by storm damage and disease has brought about a greater concern for afforestation using species that are better adjusted to the ecological conditions

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