Mapping Race and Ethnicity

H. Winlow, Bath Spa University, Bath, UK

Glossary

Anthropogeographer   An individual who works at the intersection of the disciplines of anthropology and geography, using physical racial categorizations to explore the relationships between race and space.

Anthropometric Mapping   Mapping of individual racial traits, such as cephalic index, pigmentation, or stature.

Ethnic Mapping   Mapping of aspects of ethnicity, including religion, language, nationality, and culture.

Otherness   Term used to describe the Western tradition of categorizing the Western self against the exotic other through binary categorization, such as civilized/savage, advanced/primitive.

Racial Mapping   Mapping of supposedly discrete racial groups, which may be based on a combination of physical traits.

Sign System   A set of signs or symbols used within map texts and contributing to the internal power of maps. Elements of sign systems include data division, projection, orientation, shading, color, symbols for specific features, use of arrows and lines, legends, and marginalia.

Social Construction   Idea that categories such as race, ethnicity, and gender are socially produced and are not fixed.

Introduction

The cartographic representation of race and ethnicity encompasses a range of categorization systems and mapping techniques which have been used to convey notions of difference. This discussion focuses on selected maps from the mid-nineteenth century onwards, a period which coincided with a rise in thematic cartography, an emphasis on scientific representation, and the development of increasingly sophisticated cartographic forms. Critiques of colonial mapping have demonstrated the ways in which cartographies have reinforced notions of overseas others and how Western processes of mapmaking have created cartographic silences in relation to native peoples. Alongside this erasure of ethnic groups from the landscape, there has been a separate history of racial cartography that has involved the deliberate portrayal of difference within the map text, a form of mapping that has also served to reinforce notions of 'otherness'.

The establishment of evolutionary theories in the nineteenth century led to an obsession with delineating human racial types, which were often portrayed in cartographic form. Individual anthropologists and geographers developed their own sign systems to produce racial and anthropometric maps at global, continental, and regional scales. The increasing use of statistical and cartographic techniques for state control of the social body in the late nineteenth and early twentieth centuries led to the use of ethnic cartography for delineating political boundaries, for example following World War I, a trend which remains evident in recent political cartographies. Individual cartographers have been involved in the social construction of race, which has been reinforced through cartographic power.

It is informative to provide a brief historical overview of the cartographic portrayal of race preceding the nineteenth century, before analyzing more recent mappings of race and ethnicity.

Mapping Difference

Notions of racial difference can be traced to travel accounts of the Greek and Roman periods. Descriptions of fantastic and monstrous races date back at least to Herodotus in the fifth century BC, and are also found in the work of Megasthenes, Ctesias of Cnidos, and Alexander the Great, in the fourth century BC, all of whom traveled to India. Pliny the Elder, whose work influenced Medieval thought, produced the 36-volume *Natural History* (first century AD) which consolidated many earlier works of geographical lore and included detailed descriptions of the monstrous races purported to exist at this time. Types described here included the blemmyae (with faces on their chests, lacking head and neck), the sciopods (shadow foot, with one leg and a single great foot), and the cynocephali (dog head). Pliny's bizarre descriptions of human varieties were transmitted to the Medieval period, partly because of their exotic appeal and partly because the existence of some groups could be explained anthropologically – the idea of the blemmyae appears to

have resulted from the observation of a tribe of this name, who carried large ornamental shields, giving the impression of headless men.

Myths of monstrous races were reinforced in Medieval *mappaemundi*. Both the tripartite T-O maps (which included the three known continents and were of eastern orientation) and the zonal world maps (based on a spherical world and divided into climatic zones) contained depictions of monstrous races. In the thirteenth-century Psalter map 14 monstrous races appear below the Nile, while in the Ebstorf map (*c*. 1240) 24 monstrous races appear, and in the Hereford map (*c*. 1290) 20 races appear, each located on the periphery of the known world. In Macrobian zonal maps, dating from the late Greco-Roman period, the sphericity of the Earth was central to the concept of the antipodes, enabling cartographers to place the monstrous races opposite to and below Europe. An example of a twelfth-century Macrobian world map (**Figure 1**) confined the sciopod to the antipodal region. Through cartographic representation, Australia was portrayed as a continent of perversity and otherness, in advance of its discovery by Western Europeans.

As new geographical discoveries were made by Europeans during the Renaissance, the myth of the monstrous races gradually eroded, but a fascination with racial difference remained. Alongside the mapping of new territories, Renaissance maps typically contained representations of savage races in the marginalia – a tradition that continued into the nineteenth century. By the mid-nineteenth century the whole globe, excluding the polar regions, had been explored, ordered, and cartographically reproduced. Myths of fantastic peoples had been dispelled but ideas of moral and physical difference remained, and ethnocentric assumptions about moral and physical differences were applied to contemporary populations. Following the acceptance of evolutionary theories, concepts of race hardened and the Victorian fascination with classification and measurement was applied to humanity. Some groups, such as Australian aboriginals, became regarded as the missing link of evolutionary history. Concepts of racial hierarchy were
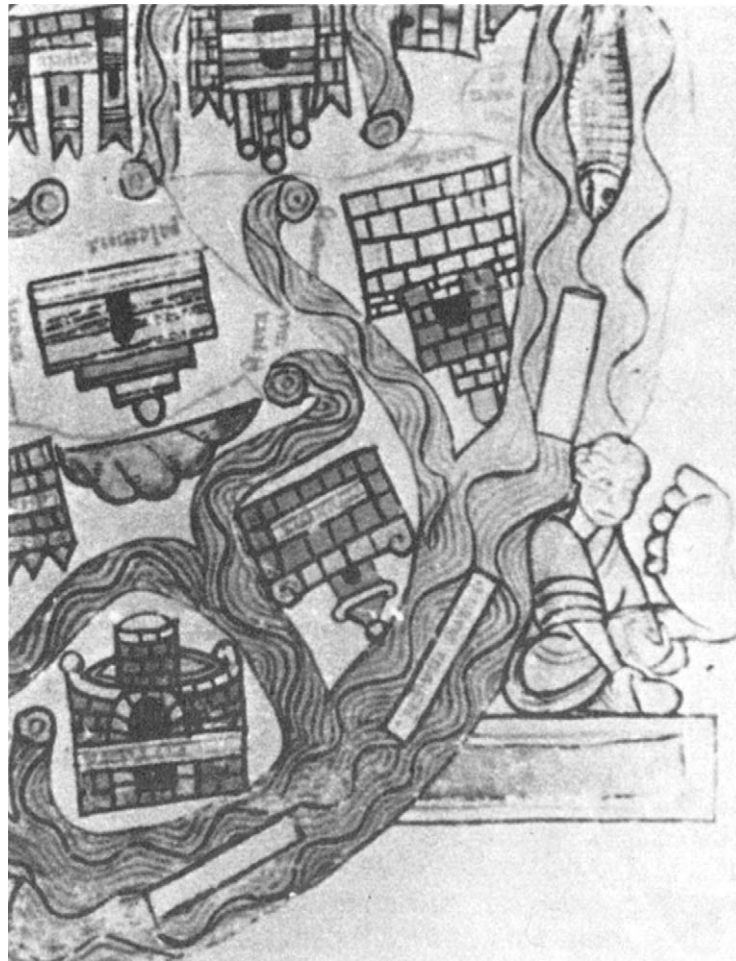

Figure 1   Sciopod on a world map, Beatus of Liebana. From Friedman, J. B. (2000). *The Monstrous Races in Medieval Art and Thought*. 2nd edn. Syracuse, NY: Syracuse University Press.

supported by an emphasis on linear progressionism and were reinforced through Victorian visual culture, including art, photography, and cartography.

Racial categorization started to become a feature of supposedly scientific maps in the early nineteenth century, with the introduction of thematic cartography. By the 1900s a rich set of techniques existed for mapping human population distributions, including population density, migration, longevity, language, and religion. In 1852 Heinrich Berghaus published his *Physikalischer Atlas*, an early example of thematic cartography, which included distributional maps of physical features, meteorology, and human populations. Nineteen ethnographic plates portrayed ethnic and linguistic geographies – for example, a map of North America showed the distribution of 34 Indian tribes, using color codes. **Figure 2** shows Berghaus' map of the human races and is an example of how racial others were portrayed in the marginalia of the map text, images which are culturally embedded in the discourse of the map.

Definitions

This discussion centers on maps produced from the late nineteenth century onwards, an era coinciding with the formation and development of modern academic disciplines, including geography, anthropology, and cartography. Within this context, it is useful to define the terminology related to mapping race and ethnicity.

Racial Mapping

The concept of racial mapping is applied to those representations where the author has attempted to prove the
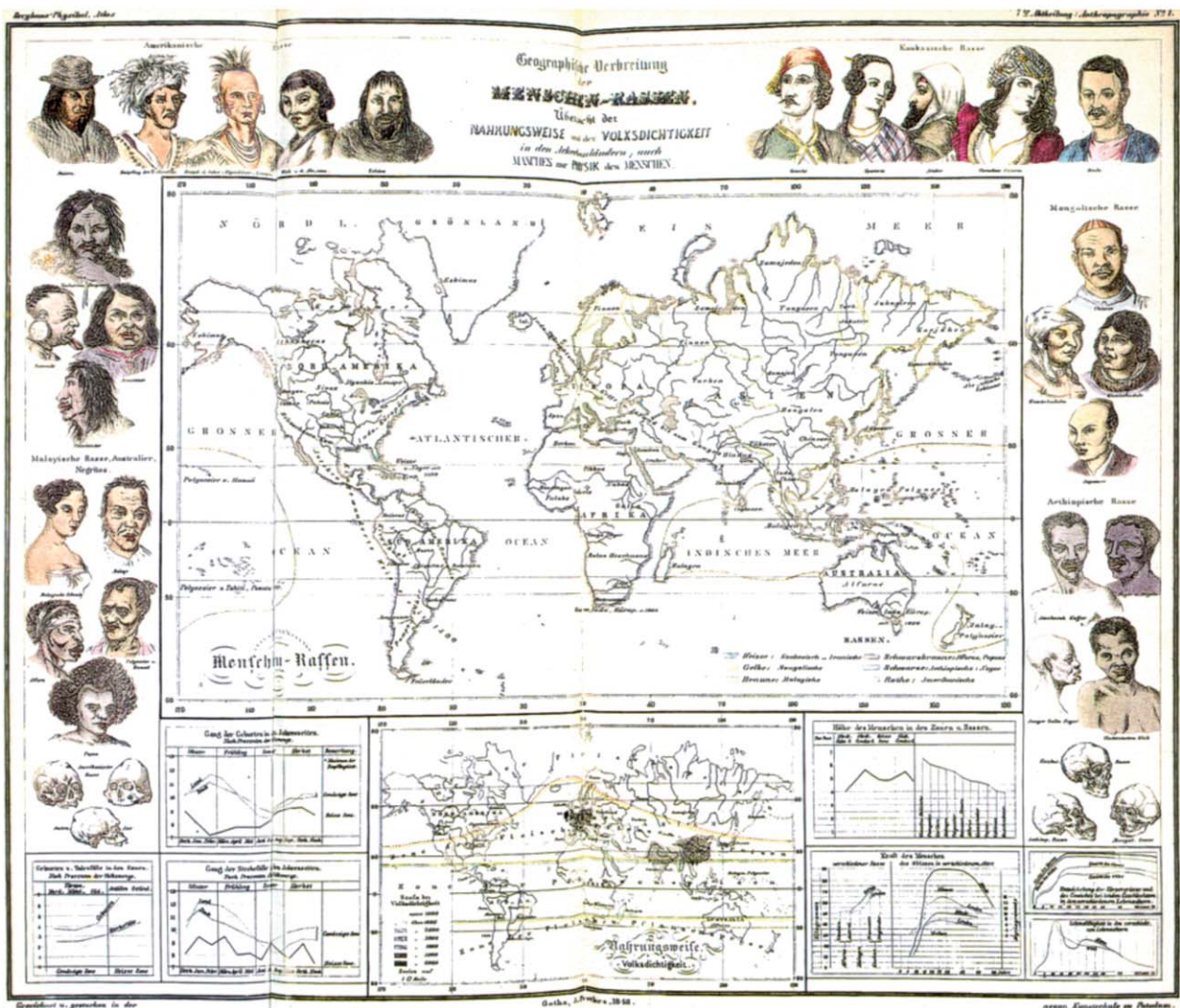

Figure 2 Map of ethnic divisions of the human race, Berghaus 1852. From Whitfield, P. (1994). *The Image of the World: 20 centuries of World Maps.* London: British Library. © British Library Board. All rights reserved (Maps 49.e.32).

existence of several discrete races, each combining a number of physical traits, such as stature or pigmentation. Examples of individuals who used this approach include American anthropologist W. Z. Ripley who argued for a tripartite division of Europe, and Australian geographer Griffith Taylor who developed a zones and strata approach to understand race.

Anthropometric Mapping

The label anthropometric applies to the mapping of individual traits (without necessarily being assigned to a racial group). This involves the production of maps that focused on single racial characteristics, including cephalic index, stature, and pigmentation. The mapping of single traits was again evidenced in the work of Ripley, and in Britain in the work of physical anthropologists, including John Beddoe, John Gray, and James Tocher, and geographers, such as Herbert John Fleure.

Ethnic Mapping

Ethnic mapping involves the mapping of aspects of ethnicity (which may overlap with biological differences). This type of mapping includes a focus on cultural differences, including religious background, perceived nationality, and language. A trend of ethnographic mapping developed in nineteenth century atlases (as illustrated by Berghaus) while later forms of ethnic cartography, based on statistical data, are represented in the US mapping of boundaries for the 1919 Paris Peace Conference. Data on ethnic group, nationality, language, and religion are collected in many modern censuses in relation to small geographic units, allowing these distributions to be mapped.

Social Construction of Race

Kobayashi has argued that the idea of race as we understand it can be traced to Enlightenment developments in scientific thinking. Immanuel Kant's stress on the links between skin color and distance from the equator fed into new ways of thinking about race, and his assumptions about links between darker skin color and inferior intellectual qualities reflected a hierarchy of people and places. Similarly, Montesquieu's 1748 *The Spirit of the Laws* emphasized the influence of environmental factors, such as climate and soil, on cultural characteristics and reintroduced the idea of the molding power of the environment which dated to the writings of Hippocrates and Aristotle. The Enlightenment concept of The Great Chain of Being reinforced ideas of racial hierarchy and progress. Victorian racial classificatory systems also had their roots in the Enlightenment period and stemmed in part from the acceptance of the Linnaean classificatory system. Carolus Linnaeus' *System in*

Nature, first published in 1735, designated animals into mammals and reptiles, identified subgroups of mammals, and Linnaeus was the first to suggest an ape-ancestry for the human species. In his second edition, of 1740, Linnaeus delineated 4 categories below the species level, defined as white Europeans, red Americans, yellow Asians, and black Africans (which remained throughout later editions). A fifth subspecies, labeled *Homo sapiens monstrosus*, included groups which he was unable to fit into his other classifications, including a selection of imaginary peoples.

In the nineteenth century the idea of discrete race types, linked to geographical region, became more strictly delineated, assuming an additional sense that initially appeared more scientific. The theory of natural selection, with its emphasis on environmental adaptation, was widely accepted but the branching tree metaphor in Darwin's work was ignored in favor of linear progress and Victorian scientists assumed an innate link between biological, socio-cultural, and intellectual development. In the early twentieth century, a few anthropologists, such as Franz Boas, questioned these assumptions, noting that cultural change seemed to develop independent of biology. However, the wider scientific paradigm continued to focus on attempts to classify both biological and cultural development. It was only after World War II and the Holocaust (which incorporated eugenic ideas advocated by racial scientists) that biologists and anthropologists fully rejected racial classificatory systems based on physical traits. Kobayashi has noted that, despite the defeat of Nazism and rejection of racism following the war, there was a systematic denial of racial issues within geographical circles. Racial issues began to be addressed, mainly in relation to spatial inequalities in the late 1960s and 1970s. Following the critical turn of the 1980s and 1990s, human geographers have come to understand the idea of race as socially constituted over time – races are social constructions and not discrete biological categories. The acceptance of this idea among social scientists has been reinforced by recent work in the field of genetics, which has been unable to find any significant and consistent divisions between biological groups on the basis of race or ethnicity.

Racial Measurement

Racial hierarchies were constructed and legitimated through Victorian racial science: physical anthropometry allowed race to be measured and classified. A number of methods were devised for calculating racial type, including phrenology, facial angle, and cephalic index (breadth of skull expressed as a percentage of length). The idea that races could be ranked on a continuous scale of civilization was applied to biological difference and extrapolated to sociocultural and intellectual

development. The socially (and arbitrarily) constructed boundaries, between different racial groups and traits, were reinforced through cartography. Many ways of interpreting, dividing, and mapping the same data were possible, since physical changes occur on a continuous scale. Stocking has observed that the terms dolichocephalic (long headed), mesocephalic, and brachycephalic (broad headed) to denote skull shape were arbitrary categories established by anthropologists. Equally, other anthropometric characteristics occurred on a continuous scale, with the result that different classificatory systems were produced from similar data.

Maps and Power

Harley's work on the deconstruction of the map, which incorporates Foucault's emphasis on power/knowledge, provides some means of understanding how the power of the map was harnessed to reinforce racial taxonomies. Maps are often regarded as neutral, scientific, and accurate reflections of the world. The fact that maps became an acceptable part of academic discourse meant that their legitimacy went unquestioned for many years. It is now widely acknowledged that maps are cultural texts reflecting wider social, cultural, and political contexts.

Methodologically, Harley's concepts of internal and external power can be utilized to critique a wide range of maps. Internal power is contained within the map text, the key to which is "cartographic progress," which includes the use of sign systems, which highlight and suppress elements through the use of shading, lines, and projection, resulting in the hierarchicalization and standardization of the landscape (Harley 1989, 13). Wood's explanations of the emergence of cartographic sign systems and of the links between signifier and signified provide a theoretical and practical framework for understanding maps as narratives, as well as understanding how maps become naturalized. The signifier (element in the map text) becomes confused with the signified (element being represented). However, it is not only the internal linguistic elements of the map that need to be open to critical analysis. Behind most maps is a patron; historically, the monarchy, the government, and the church have all initiated mapmaking schemes. External "power is exerted on cartography" (Harley 1989, 12), is often centralized and bureaucratic, and is imposed from above.

Critique of Racial, Anthropometric, and Ethnic Cartography

The mapping of race and ethnicity by geographers has involved the division of statistical data into categories and the mapping of these categories using a range of cartographic devices, including projection, orientation, shading, coloring, lines and arrows, and labeling. The cartographic representation of race has taken place across all geographical scales and cannot be divorced from wider political contexts, or from the situatedness of individual geographers. This is demonstrated below through a focus on two mapping trends: anthropometric and racial maps produced by anthropogeographers in the late nineteenth and early twentieth centuries; and the use of ethnicity data in twentieth-century boundary delineation. In the first area, Griffith Taylor's world scale zones and strata theory; W. Z. Ripley's tripartite division of Europe; and regional-scale anthropometric mapping in Scotland. In the second area I will examine the mapping of the Balkan states following World War I and consider the recent post-Yugoslav mapping of the area.

Taylor's Zones and Strata Theory of World Evolution

Griffith Taylor's (1880–1963) racial geography stemmed from a combination of geological theory, nineteenth-century racial science, and environmental determinism. *Environment and Race*, published in 1927, represented many of his principal geographical conclusions and examined the origins and distribution of racial groups. Here, Taylor argued that the ice ages and interglacial periods had triggered human evolution, and that human groups had been pushed out down three continental migration corridors (Eur-Africa, Australasia, and America) – ideas posited in W. D. Matthew's 1915 *Climate and Evolution*. Basing his categories upon cephalic index, Taylor argued for six divisions: negrito, negro, Australoid, Mediterranean, early Alpine, and late Alpine. He argued that the primitive long-headed negrito group had been pushed from a center of evolution in Asia after the first ice age, and that the Mediterranean and the broad-headed Alpine groups had evolved after the fourth glaciation – remaining closest to the center of dispersal, where temperate climates had promoted racial advancement.

Taylor applied the geological metaphor of zones and strata to the migration and development of human groups. The layers of strata were defined as artifacts from previous cultures and it was argued that each continental peninsula would contain zones of increasingly primitive peoples. The order of evolution was assumed to be the same, whether moving out from the center through the zones, or moving down through the strata. In the zones where racial evolution was considered most advanced, the buried strata of more primitive tribes would be more numerous. Taylor's cartographic elaboration of this theory is illustrated in **Figure 3**. A triangular feature in the
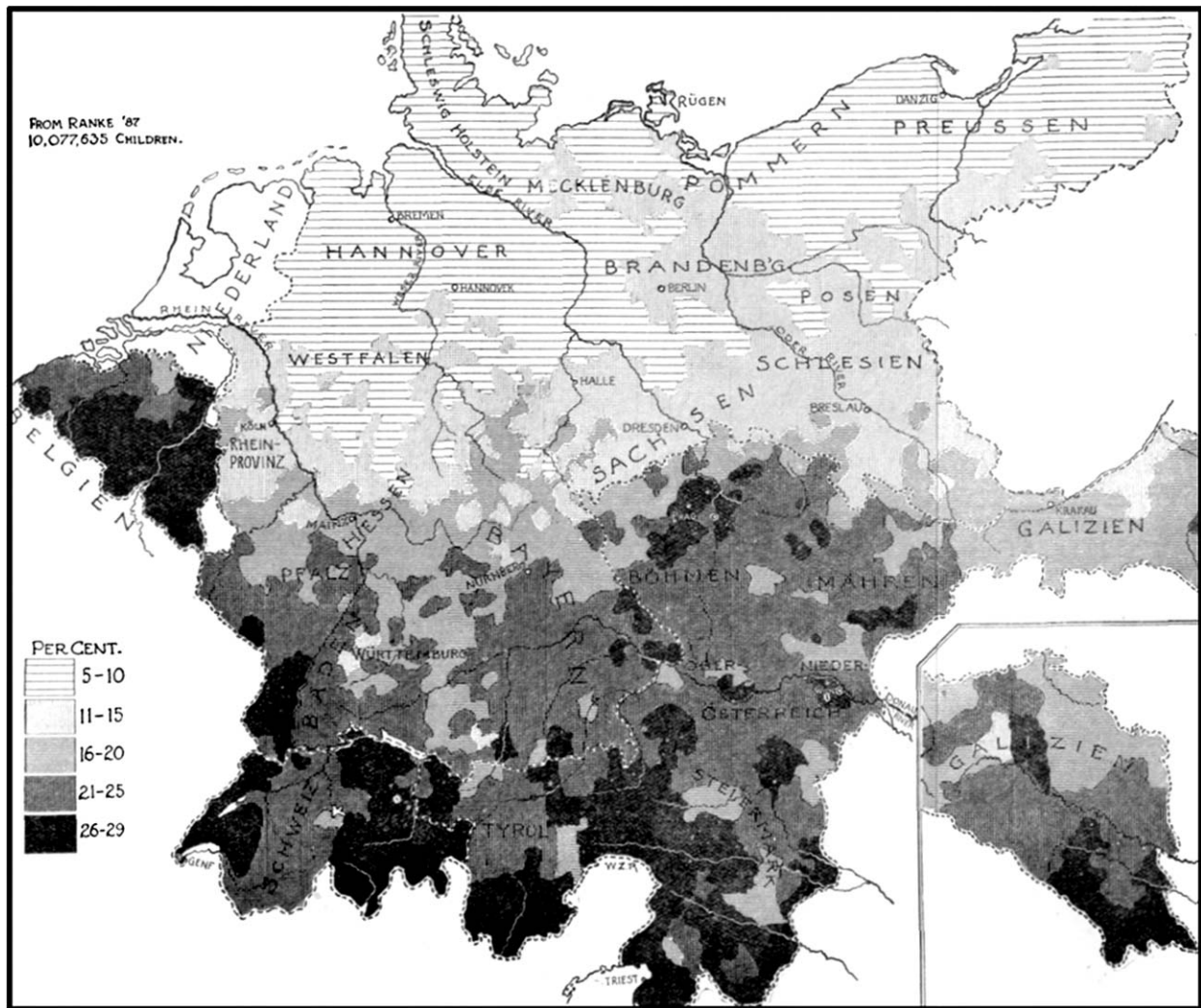
Figure 3 Migration zone classification of the races of man. From Taylor, T. G. (1919). Climatic cycles and evolution. *Geographical Review* 8(6), 289–328.

bottom left corner of the map indicates Taylor's racial taxonomy, shown as strata ranging from negrito to late Alpine. The use of the north polar projection emphasized the migration of the races outward from a central core, while arrows indicate the three migratory channels (devices previously utilized by Matthew).

Throughout his career, Taylor manipulated cartographic images and developed his own methods of graphicacy. A distinctive feature was his use of isopleths, a meteorological technique which he used to depict racial and linguistic dispersion. In his migration zone map (**Figure 3**), isopleths are used to distinguish between different strata emphasizing radial dispersion. The lines on this image are isocephalic lines, indicating areas of equal cephalic index.

Taylor's work borrowed from the field of geological mapping, as part of a wider system of scientific metaphor. Besides his zones and strata model, Taylor mapped racial and linguistic distribution using the concept of shatter belts, the lava flow analogy, and geological sections. He used block diagrams to make comparisons between the evolution and distribution of transport, mammals, and human races. Block diagrams of linguistic evolution reinforced Taylor's assumptions about primitive language groups, and he applied the geological construct of the

inlier to the Basque, the Galcha, the Welsh, and the Breton groups, again implying the existence of a physical and mental race hierarchy.

Taylor's racial cartography was sustained by the view that cartography was a neutral science, a tool which could be used to display racial truths based on anthropometric data. The incorporation of geological metaphor reinforced these ideas.

Mapping the Races of Europe

The racial theories of W. Z. Ripley (1867–1941) incorporated anthropological and geographical elements, evolutionary theories, and a reliance on statistics. In *The Races of Europe* Ripley promoted a new tripartite taxonomy for Europe, which challenged the traditional idea of one European race and suggestions of multiple European races. Statistics – which had been collected by European anthropologists throughout the nineteenth century – were used to draw conclusions about biological race types and to link social and moral issues to these traits. Central to Ripley's investigations was the notion of pure race, or type, and Ripley argued that the most reliable methods for delineating these types were cephalic

Figure 4 Relative frequency of brunette types for Germany. From Ripley, W. Z. (1899). *The Races of Europe: A Sociological Study*. London: Kegan Paul, Trench, Trubner.

index, pigmentation, and stature. His three European races included the Teutonic, found in northeastern Europe, characterized by tall stature, fair pigmentation, and a long head; the Alpine, found in central Europe, characterized by medium stature and pigmentation and a broad head; and the Mediterranean, found in southern Europe, characterized by dark pigmentation and a long head. It was assumed that every individual belonged to one of these categories or resulted from an intermixture of them.

Ripley's cartography legitimated his racial categorizations and emphasized the idea that particular racial groups inhabited particular spaces. In producing his maps Ripley consciously adopted a method that, he argued, rendered all data comparable (although his statistics had been gathered from a wide range of sources, using a variety of collection methods). Views expressed in an 1899 article on mapmaking, and the collation of the maps

in *The Races of Europe*, illustrate a desire to represent the racial truth, which involved his objectification of human individuals.

Figure 4 shows Ripley's map of brunette types for Germany. The portrayal of increasing pigmentation from north to south (representing Teutons in the north and moving to an intermediate type in the south) is particularly dominant in this map, and could serve to reinforce assumptions of a biological racial hierarchy, where advanced races are associated with temperate northern latitudes and reflecting traditional assumptions, including Kant's theories that pigmentation is related to distance from the equator. The internal power of the map text lies in the imposition of geometrical divisions on the population and the landscape, as well as the use of shading that reinforces color divisions. Ripley's maps were supported by external power manifested in the

cultural acceptance that races could be identified scientifically, and that they could be hierarchically classified.

In *The Races of Europe*, Ripley's maps effectively demonstrated the existence of a tripartite scheme in Europe. His later work drew on these assumptions and involved a metaphorical mapping of social and moral geographies onto the US landscape. In the late nineteenth century US increased immigration, from eastern and southern Europe, was regarded as a problem by the elite. There were fears that increasing rates of divorce and suicide and low birth rates among Anglo-Saxons could lead to the race suicide of this group. Hints of these fears were apparent in *The Races of Europe* where Ripley discussed the persistence of the darker (Mediterranean) types in city environments and mapped the occurrence of suicide and divorce, in relation to cephalic index. While initially refraining from stressing a hierarchical element in his scheme, this became implicit in Ripley's later work, allowing his divisions to be used in support of immigration restriction. A 1913 map produced by Ripley for the *New York Times* highlighted the immigrant problem. This image, based on 1910 census data, showed the percentage of foreign-born whites in the total population and accompanied an article titled 'Census figures disclose grave racial problems'. Here, darker shading denoted the greatest dominance of the Mediterranean immigrants, and was shaded according to state (and not city) boundaries, visually emphasizing the concentration of immigrant groups.

Mapping Regional Identities

The regional mapping of racial traits is evidenced by the anthropometric mapping of the Scottish and Welsh populations in the UK. In the nineteenth century, the industrious characteristics of the Teutons were contrasted with the image of the Celts as backwards. Separately, the development of Gaelic pride romanticized Celtic life and culture, which was seen as isolated from modernity. These developments resulted in a confused notion of Scottish ethnic identity, where lowlanders were associated with English hegemony and highlanders were constructed as culturally and racially other.

A series of articles mapping anthropometric traits in Scotland were published in the *Journal of the Royal Anthropological Institute* (*of Great Britain and Ireland*) in the early twentieth century. This included work by Scottish anthropologists James Tocher and James Gray and British anthropologist John Beddoe. Far from denigrating the Celtic roots of the population Tocher regarded Scotland as having many areas of good stock, particularly in rural areas. Tocher and Gray were motivated to collect statistical population data across Scotland. Similar motivations led H. J. Fleure, who felt that Welsh rural and cultural traditions were central to Welsh identity, to map racial traits in Wales. In a 1900 paper, Tocher and Gray mapped the pigmentation characteristics (of hair and eyes) of the East Aberdeenshire population based on statistics gathered at the 1895 Mintlaw gathering and at schools across the region. Pigmentation characteristics were mapped by plotting percentages of the type of pigmentation for each school. Numbers were then treated as if they were heights on a relief map (in a way similar to Taylor's construction of isocephalic lines) and then shaded to impose visual clarity on the data. Several areas on the maps displayed highly regular boundary lines reflecting the use of mathematical formula employed rather than any natural divisions between racial types.

In a 1907 article, Gray produced 21 anthropometric maps based on pigmentation data from approximately 500 000 school children across Scotland. He observed that the intervals between the contour lines were shaded in order to make clear the various densities of pigmentation. Again, a geometrically imposed classification was clear in the maps produced. Here, Gray also introduced his idea of divergence maps which were produced for boys' hair and eye pigmentation (**Figure 5**). These were constructed using logarithms based on pigmentation frequencies on an area basis and the final values were again used to define the contour intervals. The maps were intended to reveal how the population was distributed within the country and to identify which areas were made up of native Scots (darker pigmentation) and which of Norse invaders (lighter pigmentation). Gray's statistics later formed the basis of John Beddoe's 1908 map based on the compound index of nigrescence, where a high nigrescence index (a quasi-algebraic equation invented by Beddoe) was equated with the Celtic population.

The division of the population on the basis of hair and eye color was an artificial construct. Other formulas could be, and were, used to produce widely varying results, depending on the values given to each characteristic. Anthropometry reflected a search for characters that would display the correct ranking of race, which reflected the assumptions made by individual racial scientists.

Ethnicity and Boundary Making in the Balkans

Crampton has investigated the relationship between cartographic knowledge, biopolitics, and the spatialization of race, through a study of maps produced by the US for the 1919 Paris Peace Conference. The Inquiry, established in 1917 and comprised mostly of academics (including geographers Isaiah Bowman and Ellen Churchill Semple), was charged with determining American policy. The aims of the Inquiry were to collect statistical information relating to territorial claims and to
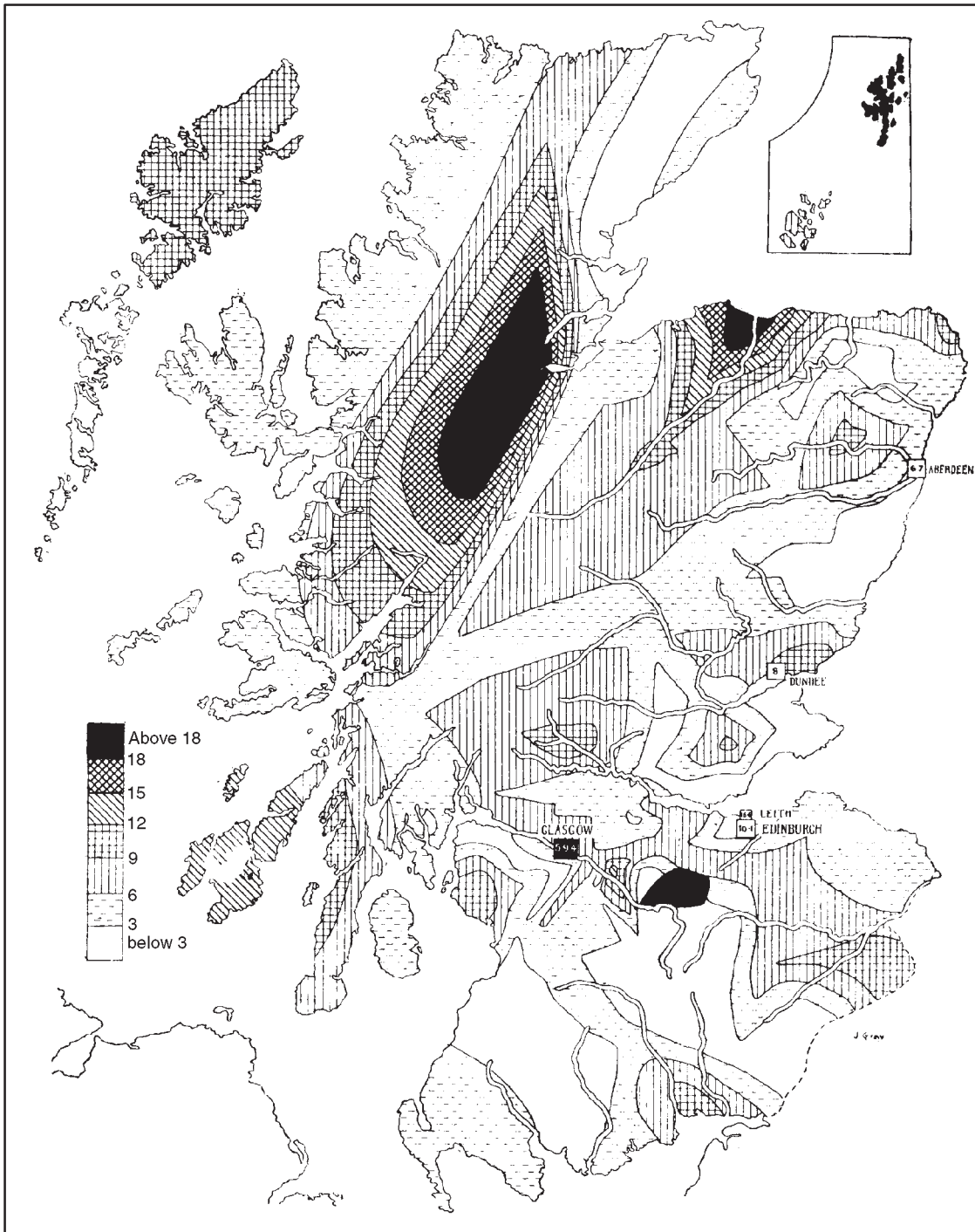
Figure 5 Divergence map for boys' eyes, Scotland. From Gray, J. (1907). Memoir on the pigmentation survey of Scotland. *Journal of the Royal Anthropological Institute* 30, 104–124.

produce maps of possible future political boundaries. Racial groups across Europe were identified and maps were produced for each area showing the boundaries for mixed and doubtful zones. Racial boundary lines were added where local authorities agreed and a system for delineating the boundaries of disputed territories was devised. The final system relied solely on the supposedly neutral American and British maps, rejecting other maps (Serbian, Bulgarian, Greek, and Albanian) as propaganda. While the Inquiry focused on mapping race, aspects of perceived nationality, language, and religion (terms that were used in an ambiguous and sometimes

interchangeable fashion) influenced decisions. Many boundary decisions were made on linguistic grounds, an ethnic, rather than a biological category. A black book, produced for use by US conference representatives, recommended boundaries across Europe and included 22 maps, many of which focused on eastern and southeastern Europe – the main area in dispute being the Balkans region. For Yugoslavia the black book recommended that boundaries follow linguistic divisions, apart from in two areas. The Inquiry adopted Jovan Cvijic's (1865–1927) suggestion that the northern Albanians be united with western Serbia and southeastern Montenegro, under Yugoslavia and ignored local claims. In Istria, a line was placed further to the east than the linguistic boundary placing 370 000 Yugoslavs in Italy. The boundary line was disputed after World War II, resulting in the killing and deportation of Italians. The Inquiry delineated boundaries across Europe, which was assumed to reflect an underlying racial and ethnic partition – categories defined by outsiders, and not always relevant at the local level.

Jansen has analyzed the role of nationality statistics and maps in representations of the post-Yugoslav wars, noting that most academic work in the field has included pre-war 1991 census data on nationality per republic. Maps of ethnic distribution, based on this data, served the purposes of the engineers of ethnic cleansing, but critical observers have used these maps to contrast the complexity of the pre-war situation with the neat post-war maps – testifying to the processes by which territories were homogenized. Yansen critiques the uncontextualized use of the pre-war maps, which entails dangers of misrepresentation. The power embedded in the map texts, and their utility for political purposes, was served through cartographic sign systems. The use of color to differentiate ethnic groups represented majority territories and did not denote a region of only one national group, representing anything between 50% and 100% of the population (based on 1991 data). In some instances, maps of Bosnia showed a group as belonging to an area, which included less than 50% of that group. Some of the map areas with no absolute majority were represented as blank indicating a misleading sense that homogeneity is the norm, as apparently represented in the colored areas. Jansen (2005, 48) concludes that: "Cartography cannot be seen in isolation from struggles for power/knowledge: mapmakers make choices about what to show or not and they select a certain overlap between statistics and territory."

Race, Ethnicity, and Genetics

While the acceptance of race as a social construction is widespread among social scientists, the idea of race and ethnicity as definable categories remain widely accepted in society. Categories are reinforced through patterns of group identification; the media; and the use of ethnic categories in national censuses – which reflect governmental concerns of population control, as well as the immigration history of the country concerned (for example, the 2001 UK census include categories for Indian, Pakistani, and Bangladeshi). A recent UK study by Smart et al. reveals that the census categories (as defined by the Office of National Statistics) are widely applied in genetic medical research. While some biologists have rejected the concept of race as meaningless, others rely on it extensively. Some scientists argue that current race categories should continue to be used at present (partly due to the portability of these categories into other fields and the current lack of genetically precise boundaries). Others recognize that the messy categories of race and ethnicity make it illogical to continue to rely on these divisions and argue for the need to use a different basis of group identification, based on current genetic knowledge (which would translate less well into the public consciousness).

Marks, Tishkoff and Kidd, and Jorde and Wooding have argued that broad geographical groupings can be defined, such as European and African, but note that these categories are overlapping and continuous, with genetically intermixed groups existing at the boundaries of geographical areas. Populations are thus related to geographical clines and are understood in relation both to local adaptation to climate and to interbreeding. However, discrete boundaries, as defined by national censuses, continue to be used. Marks reports that attempts to map racial populations using genetic criteria have resulted in different classifications and mapped representations (reflecting failed past attempts to find a single classificatory system).

Reflections on past scientific practices reinforce the idea that present science is also underpinned by societal concerns, which means that ethical considerations should be at the forefront of research based on racial and ethnic categorizations. Often a focus on disease in ethnic groups (e.g., sickle cell anemia in the west African population) can result in groups which have been historically discriminated against, being selected for research. Cultural values influence scientific analysis, including genetic analyses, and scientists continue to bear a social responsibility for conclusions reached in analyses of the human species.

Conclusions

Through a selection of cartographic texts this discussion has illustrated that there has been a tradition of mapping racial difference, dating at least to the Medieval period.

Through external power, based on the assumption that categories can be easily delineated and defined spatially, and through internal power, inherent in the sign systems of cartographic texts, cartography has been used to reinforce ideas of racial hierarchy, to support imperialism, and to legitimate nationality claims. While anthropometric measurement became outdated in the mid-twentieth century, modern governments continue to monitor the social body through the collection of data based on ethnic group, nationality, and religion, and genetic research currently relies on national classifications of ethnicity. These systems are based on the assumption that every individual can be neatly classified and mapped, leaving little space for ideas of contested identities, which have now become accepted in wider academic and social discourse. Current understandings of nationality reinforce the idea that identity is bounded by territory when in fact identity is often hybrid and contested, and transcends neatly imposed geographical boundaries.

See also: Cartographic theory; Darwinism (and social Darwinism); Environmental determinism/environmental geography; Ethnicity; History of Cartography; Lamarck(ian)ism; Maps and the State; Other/otherness; Race.

Further Reading

Crampton, J. W. (2006). The cartographic calculation of space: Race mapping and the Balkans at the Paris Peace Conference of 1919. *Social and Cultural Geography* 7(5), 731–752.

Crampton, J. W. (2007). Maps, race and Foucault: Eugenics and territorialization following World War One. In Crampton, J. W. & Elden, S. (eds.) *Space, Knowledge and Power: Foucault and Geography*, pp 223–244. Aldershot: Ashgate.

Friedman, J. B. (2000). *The Monstrous Races in Medieval Art and Thought* (2nd edn.). Syracuse, NY: Syracuse University Press.

Gray, J. (1907). Memoir on the pigmentation survey of Scotland. *Journal of the Royal Anthropological Institute* 30, 104–124.

Harley, J. B. (1988). Maps, knowledge and power. In Cosgrove, D. & Daniels, S. S. (eds.) *The Iconography of Landscape: Essays on the Symbolic Representation, Design, and Use of Past Environments*, pp 277–312. Cambridge: Cambridge University Press.

Harley, J. B. (1989). Deconstructing the map. *Cartographica* 26(2), 1–20. http://utpjournals.metapress.com/content/ e635782717579t53 (accessed in Apr. 2008)

Harley, J. B. (2001). *The New Nature of Maps: Essays in the History of Cartography*. Baltimore, MD: Johns Hopkins University Press.

Jansen, S. (2005). National numbers in context: Maps and stats in representations of the post-Yugoslav wars. *Identities: Global Studies in Culture and Power* 12, 45–68.

Jorde, L. B. and Wooding, S. P. (2004). Genetic variation, classification and 'race'. *Nature Genetics* 36, S13–S15. http://www.nature.com/ ng/journal/v36/n11s/index.html (accessed in Apr. 2008).

Kobayashi, A. (2003). The construction of geographical knowledge: Racialization, spatialization. In Anderson, K., Domosh, M., Pile, S. & Thrift, T. (eds.) *Handbook of Cultural Geography*, pp 544–556. London: Sage.

Marks, J. (1995). *Human Diversity: Genes, Race and History*. New York: Aldine De Gruyter.

Martin, P., Ashcroft, R., Ellison, G. T. H., Smart, A. and Tutton, R. (2007). *Reviving 'Racial Medicine'? The Use of Race/Ethnicity in Genetics and Biomedical Research, and the Implications for Science and Healthcare*. London: St George's, University of London.

Oldroyd, D. R. (1994). Griffith Taylor and his views on race, environment, and settlement, and the peopling of Australia. In Branagan, D. F. & McNally, G. H. (eds.) *Useful and Curious Geological Enquiries Beyond the World. Pacific-Asia Historical Themes: The 19th INHIGEO Symposium*, pp 251–274. Sydney, NSW, Australia, 4–8 July. Springwood, NSW: International Commission on the History of Geological Sciences, Conference Publications.

Ripley, W. Z. (1899). *The Races of Europe: A Sociological Study*. London: Kegan Paul, Trench, Trubner.

Ryan, S. (1996). *The Cartographic Eye: How Explorers Saw Australia*. Cambridge: Cambridge University Press.

Smart, A., Tutton, R., Martin, P., Ellison, T. H. and Ashcroft, R. (2008). The standardisation of race and ethnicity in biomedical science editorials and UK biobanks. *Social Studies of Science* 38(3), 407–423.

Stocking, G. W. Jr. (1968). *Race, Culture and Evolution*. Chicago, IL: Chicago University Press.

Taylor, T. G. (1919). Climatic cycles and evolution. *Geographical Review* 8(6), 289–328.

Tishkoff, S. A. and Kidd, K. K. (2004). Implications of biogeography of human populations for 'race' and medicine. *Nature Genetics* 36, S21–S27. http://www.nature.com/ng/journal/v36/n11s/index.html (accessed in Apr. 2008).

Whitfield, P. (1994). *The Image of the World: 20 Centuries of World Maps*. London: British Library.

Winlow, H. (2001). Anthropometric cartography: Constructing Scottish racial identity in the early twentieth century. *Journal of Historical Geography* 27(4), 507–528.

Winlow, H. (2006). Mapping moral geographies: W. Z. Ripley's races of Europe and the U.S. *Annals of the Association of American Geographers* 96(1), 119–141.

Winlow, H. (in press). Griffith Taylor's cartographic experiment: Racial strata and geological anthropometry. *Geographical Research*.

Wood, D. (1993). *The Power of Maps*. London: Routledge.

Woodward, D. (1987). Medieval *Mappaemundi*. In Harley, J. B. & Woodward, D. (eds.) *The History of Cartography, Volume One: Cartography in Prehistoric, Ancient and Medieval Europe and the Mediterranean* pp 286–370. Chicago, IL: University of Chicago Press.

Relevant Websites

www.censusscope.org
    Census Scope Website, US. Link to maps of race and ethnicity based on data from the 2000 census.

http://www.genome.gov
    National Human Genome Research Institute, US.

http://www.lib.utexas.edu
    Perry–Castañeda Library Map Collection, University of Texas, Austin, US. Collection of maps of Bosnia and the former Yugoslavia, including maps of ethnicity.