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Centenary article

American geography, social science and the Cold War

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ABSTRACT: This article argues that the history of geography should be written from an externalist perspective; that is, its history should be directly related to the larger historical context in which it is embedded. My example is American human geography during the early Cold War period. The argument is that as a result of America's experience during the Second World War, the USA mobilised its academy to help it win the Cold War. America drew not only on the physical sciences, but also the social sciences. Given the success of the physical sciences in winning the Second World War (especially the Manhattan Project that produced the atomic bomb), the model for Cold War social sciences were the physical sciences. Therefore, like them, American social sciences increasingly carried out large, multi-disciplinary projects, which were generously funded by the state, and which used formal, mathematical techniques and models to analyse big numerical data sets using the cutting-edge computing machines of the day. Because of some powerful individual gatekeepers, human geography initially resisted the kind of change that other American social sciences experienced. By the mid-to-late 1950s it could resist no longer. As exemplified by the work of William Warntz, American human geography also became another Cold War social science.

Introduction

'Every discipline, it seems, has its Cold War dirty laundry to air' (Isaac, 2007, p. 736).

While particular aspects of geography – distance, relative location, national boundaries, topography and ground surface cover – were central to the history of the Cold War, for the most part the Cold War has not been central to writings about the history of geography. This was partly due to a particular approach that until the last 20 years dominated the writing of geography's disciplinary history called internalism. Internal histories conceived academic knowledge as the product of only an interior disciplinary logic. It was only what went on within a discipline that mattered. Consequently, the Cold War (or, in fact, any war) made no difference to a discipline's historical trajectory. In contrast, an externalist approach to disciplinary history, and which increasingly has become the form in which geography's history is now told (and the one favoured in this article), suggests that we must pay attention to what happens outside the discipline – that is, to the historical and geographical context in which the discipline is embedded. Writing an externalist history of geography involves delineating the interconnections, links and causal chains between larger external events and movements and the discipline's internal intellectual character and constitution: its objects of analysis, its conceptual frameworks, its theories, its methods, and its philosophical underpinnings. An externalist history shuns timeless internal disciplinary logics, emphasising instead the continuing historical and geographical processes that produce, at least at a particular period and place, a temporarily stable and distinctive version of the discipline.

From an externalist perspective it is impossible to ignore the Cold War. For more than 40 years it defined global post-War history, and for some it has not yet ended. Here my focus is on its first and possibly most potent phase, the so-called 'High' Cold War period that began in 1947 with the enunciation of the Truman Doctrine. This Doctrine represented the US foreign policy, and was designed to inhibit Soviet expansion. It ended in

October 1962 with the Cuban missile crisis (Issac and Bell, 2012). Over that 15 year period, hanging over the United States (or more precisely pointing at it) was the Bomb with its potential, as Nikita Khrushchev put it, to cover America 'with ashes and graves' (quoted in O'Hagan, 2009, p. 27). Consequently, America was militarised, its citizens inhabiting in effect a giant 'army camp, mobilized to lend support to the permanent state of war readiness' (Lutz, 2001, p. 3).

War readiness came in many different forms. Certainly it was found in America's arsenal of inter-continental ballistic missiles, its stockpiles of nuclear warheads, and its fleet of B-52 SAC bombers, but there were also non-material ways of being war-ready, which included those that bear on my concerns: academic knowledge, and the project to write an externalist disciplinary history of Cold War American geography. Academic knowledge has long been a critical component of military strategy, and has often been changed in that very relation. The Second World War was a particularly fecund period in the interaction between the military and academics. For example, physicists simultaneously contributed to knowledge and to the Allied war effort through their work in developing both radar at the Massachusetts Institute of Technology's Lincoln Labs (the 'RadLab'; Buder, 1996) and 'the Bomb' as part of the Manhattan Project (Goueff, 1967). Social scientists contributed too, including geographers. In Britain during the Second World War, university geographers were employed to write Naval Intelligence Handbooks, regional monographs of strategically important wartime areas (Clout and Gosme, 2003). During the same period in the United States, geographers assigned to the Office of Strategic Services (OSS) gathered, interpreted and disseminated military intelligence. In fact, the OSS was the direct forerunner of the Central Intelligence Agency (CIA), and employed more professional geographers than any other branch of the US government (Harris, 1997).

It was, however, a two-way relationship, as involvement with the military could also change the character of disciplines. This, I will argue, was the case once the Second World War ended and gave way to the Cold War. Here, I suggest that the Cold War shaped – and brought into being – a new kind of social scientific knowledge. This knowledge was defined by such novel practices as collaborating with other disciplines (interdisciplinarity), setting instrumental (often state-conceived) research ends, funding research projects through large research grants, and using mathematical models, statistical analysis and computing machines.

In this article, I will suggest that geography in the United States was swept along in the Cold War movement, and became mangled within it. American human geography moved from an overly descriptive discipline (i.e. one that relied often on unsystematic ideographic observations drawn from field work) to one that aspired to the emerging structure of Cold War social science. In this form, geography sought the nomothetic (i.e. drew on theory, numbers and statistical techniques), was practised in a computer centre or in a statistics laboratory filled with Marchant or Friedan electrical calculators, and was funded by the State or by large philanthropic foundations such as Ford or Rockefeller. As the historian Dorothy Ross said in her review of twentieth-century social sciences, during the Cold War 'even geography shed its identity as a synthetic study of the geographical world and regrouped around abstract theories of spatial interrelations' (2003, p. 231).

The article is divided into three sections. The first reviews the emergence of American social science and its central characteristics during the Cold War. The second examines the process by which the larger form of Cold War social science came to inhabit American geography. It focuses on one important moment when the disciplinary old guard represented by Richard Hartshorne tried in his dispute with Fred Schaefer to quash the introduction of Cold War social science. Hartshorne was unsuccessful; the larger external forces of the Cold War were too powerful for him to resist. These forces did, however, give rise to William Wernick (1922–88), and his project of macrogeography. The final section of this article focuses on Wernick's life and work, which, I contend, was the embodiment and fulfilment within geography of Cold War American social science.

American social science

The American playwright Arthur Miller described the Cold War period as 'the biggest boom in the history of the world' (quoted in Rifkin, 1994). It was certainly a boom for American social sciences. Over the period 1947–62 membership of the Association of American Geographers increased by more than 300%, and the expansion in memberships of other American professional social science associations were even larger (Crowther-Heyek, 2006).

This advance was due partly to Cold War financial largesse: large sums of research money were provided by the US Department of Defence (USDoD). This was, in effect, a continuation of the role that the USDoD performed during the Second

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World War. Within the 'High' Cold War period the Office of Naval Research (ONR) played an especially important role. In 1949, it funded 40% of the US's pure and academic research. Other large financial contributors included such private foundations as Rockefeller, Carnegie and Ford. Of these, Ford was the most important with a financial endowment twice those of Carnegie and Rockefeller put together. In turn, this large-scale funding facilitated 'big social science', the complement to the 'big science' model that had yielded such spectacular results during the Second World War (Crowther-Heyek, 2006, p. 426). From the late 1950s, human geography also increasingly took on the characteristics of big social science: with its interdisciplinary, team-based approach; the use of the latest machines; rigorous analysis of (at that time) big data sets; and research funding especially from ONR.

Big social science received such funding partly in order to allow it to try to solve practical problems. This, again, was a legacy of the Second World War, when the American government employed both natural and social sciences to solve the one big practical problem: how to win a world war. As (then General) Eisenhower reflected in 1946:

'The lessons of the last war are clear. The military effort required for victory threw upon the Army an unprecedented range of responsibilities, many of which were effectively discharged only through the invaluable assistance supplied by our cumulative resources in the natural and social sciences ... This pattern of integration must be translated into a peacetime counterpart' (quoted in Allison, 1985, p. 290).

It was under (now President) Eisenhower that the immediate practical problem for the social sciences was how to win the Cold War. From the early 1960s, however, it also became how to win various domestic social 'wars' including those on US poverty, urbanisation and health delivery. They would be won by relying on techniques, models and strategies that had been first worked out in a military setting albeit now applied within 'Camp America' (Lutz, 2001). There was a belief that like science, social science could do anything as long as it followed the right method and used the correct theory (Isaac, 2007).

One of the most famous American social scientists at the time was Talcott Parsons. Parsons was the first Chair of the Social Relations Department at Harvard University, which brought under a single umbrella sociology, anthropology, social psychology and statistics. Following what had been done by physicists at Los Alamos, Parsons in his December

1949 Presidential speech to the American Sociological Association urged that social scientists turn their hand at 'splitting the social atom' (see Lemov, 2010, p. 404, fn. 5). Parsons liked the oxymoron 'impossible possible', believing that under a new Cold War social science things 'could be done that had never been doable in the past' (quoted in Lemov, 2010, p. 411). This belief was taken up by geographers adopting Cold War social science. They were convinced that having been previously hobbled by its ideographic past, geography was now ready to 'split the geographical atom' in order to do things that had never been done before.

When Parsons died in May 1979, *The New York Times* headlined his obituary, 'Nobody's theories were bigger' (see Lemov, 2010, p. 404). Parsons promoted a particular type of theory – one that was the aspiration of many Cold War social sciences. This theory was defined by abstraction, involved logical rigour, often included the use of mathematics, was sometimes justified by philosophical positivism and employed formal empirical methods that frequently involved the use of one cutting-edge computing machine or another (Isaac, 2007). However, in line with the regime's practical ambition, it was not necessarily pure theory. Instead, it was often expressed as a model (Barnes, 2008). Models lay somewhere between 'mere description' and pure theory. The virtue of models was that they got things done, they allowed one to intervene and to solve puzzles; and they were typically immune to higher-level philosophical disputes. Furthermore, modelling was a practical activity, a hands-on accomplishment, one that required training, drill and practice in order for the individual to be successful at it. Repeated performances allowed the creation of individuals capable of developing and deploying theories and models. Exactly those same ends and processes unfolded in Cold War human geography. New competent subjects were produced to undertake Cold War spatial social science theorising and modelling.

The training, drill and practice described above often involved the use of machines. At first these were mechanical and electronic calculators, although later the machines took the form of the computer (Dyson, 2012). While the specific forms and uses of computers changed substantially during both the Second World War and Cold War periods, at their core was an ability to address at inordinately high speeds large-scale calculative problems that were, initially, essential to military strategy. In the US, computer development cost more than US\$2 billion in nominal terms, much of it coming from ONR (Hughes, 1998). By the mid-

1950s, however, computers were no longer tied exclusively to direct military ends. They were increasingly found in a number of American universities (both private and public) and used not only by physical scientists, but also by social scientists – including, somewhat unexpectedly, geographers.

All these various features – large sums of money, big social science research, theory and models, technical training and machines – were brought together at what was later termed the ‘Cold War University’ (Leslie, 1993). Although the Ivy League universities were especially prominent, Cold War social science was not confined to just these institutions. This was the case for geography, which had been banished from Harvard in 1948 just as the High Cold War was beginning. Such was the close link between American universities and the Cold War that Senator William J. Fulbright coined the term ‘military-industrial-academic complex’ (Leslie, 1993, p. 2). For some, this tight integration between the military state and the university was a Faustian bargain: it was seen as selling one’s academic soul for an ONR grant. Moreover, here was the best evidence for how such integration fundamentally changed the nature of the academic knowledge produced. Paul Forman (1987) demonstrated that, during the period 1940–60, massive Cold War military funding meant that American physicists redefined the character and course of their research from basic to applied physics. Researchers on Cold War social science have suggested a similar kind of influence, maybe even more so than in physics, with social science becoming practical and applied. In the process, as was the case of geography, methods, theories, disciplinary practices and epistemological standards changed radically, and it is to geography’s makeover that this article now turns.

American geography as Cold War social science

Until the Cold War, academic geography lay betwixt and between categories – not quite natural science, but not quite human science either. It seemingly studied everything: the Earth and life on Earth. The only disciplinary agreement was its unit of enquiry, the region: the region was where geography’s disciplinary ends were investigated, fitted together and unified.

Hence the various national traditions of regional geography that began first in Germany, then France, Britain and then the United States (Barnes, 2011). The most rigorous, systematic rationale justifying the region as the discipline’s focus written in English did not appear until the late 1930s.

Richard Hartshorne’s (1939) *The Nature of Geography* began as a rejoinder to the Berkeley geographer John Leighly’s 1937 paper published in the *Annals of the Association of American Geographers*. However, it then simply got out of hand (see Hartshorne, 1979). The *Annals* editor, Derwent Whittlesey, told Hartshorne that his response ‘could be brief’, but Hartshorne just kept on writing, unable to stop until he had exceeded 600 manuscript pages (1979, p. 69).

Hartshorne’s (1939) *Nature* made geography’s bedrock the region, defined as a unique combination of objective geographical elements. The consequence of this definition, however, was to undermine the use of scientific laws to explain geographical (regional) entities. A scientific law requires that always and everywhere the same cause produces the same effect. For Hartshorne, though, because one region is fundamentally different from another, the same cause will produce radically different (regional) effects. Consequently no geographical laws can ever be stated. Hartshorne summarised it thus:

‘We arrive, therefore, at a conclusion similar to that which Kroeber has stated for history: “the uniqueness of all historical phenomena... No laws or near laws are discovered.” The same conclusion applies to the particular combination of phenomena at a particular place’ (1939, p. 446).

Geographers, therefore, could not do any of the things that natural science was able to accomplish with its recourse to physical laws; that is, to explain, predict and knowingly intervene. In the Hartshornian conception of the region, geographers could only describe. As Hartshorne stated: ‘Regional geography, we conclude, is literally what its title expresses: ... it is essentially a descriptive science concerned with the description and interpretation of unique cases’ (1939, p. 449).

In retrospect the timing of Hartshorne’s argument for a science of geography based on the descriptive study of unique regions could hardly have been worse. Forces within the Second World War, and soon after within the High Cold War, increasingly pushed, pressed and agitated geography to join and mix with other social sciences; to lose its betwixt and between status; to become a modern social science discipline. To understand that transformation requires an externalist history of geography.

Initially the discipline was slow to change, a result in part of the disciplinary power of Hartshorne to

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maintain his version of geography. Yet, in 1953, in the *Annals of the Association of American Geographers*, Hartshorne's position was directly challenged by Fred Schaefer (1953), a socialist German refugee economist turned geographer at the University of Iowa. Schaefer argued both for scientific laws in geography and for their use to meet the (Cold War social science) ends of explanation, prediction and intervention. Hartshorne was apoplectic with rage: he wrote to the editor about Schaefer's article: 'In whatever sense it is possible for a learned journal to commit a crime... The *Annals* has committed a crime unparalleled in its history [and, as Hartshorne continued] had create[d] a mess, for me, and for American geography' (quoted in Martin, 1989, p. 76). Hartshorne demanded, and got, two replies. Ferociously combative, the reposts were less about silencing Schaefer (who had in the interim died of a heart attack at an Iowa City cinema before his article was even published) than silencing potential supporters of Schaefer. Hartshorne continued to seek out and correct Schaefer's supporters right up until the late 1980s shortly before his own death.

Hartshorne could not stop the inevitable: given the power of Cold War external forces, American geography inexorably joined other American social sciences. Even subjects in the humanities, such as philosophy, were similarly transformed – all of them taking on the general features of Cold War social science. The process of transformation in geography began at a few selected sites – in Seattle at the University of Washington, in Iowa City at the University of Iowa, and in New York at the American Geographical Society – and was carried corporeally through the travels of protagonists as they moved to new jobs in new places such as Chicago, Ann Arbor, Columbus, Toronto, and (for a short period) Cambridge, Massachusetts. Rather than providing

a 'Cook's tour' of these various sites of what was called 'geography's quantitative revolution', the final section focuses on one individual and his intellectual pursuit: William Warntz and 'macrogeography'.

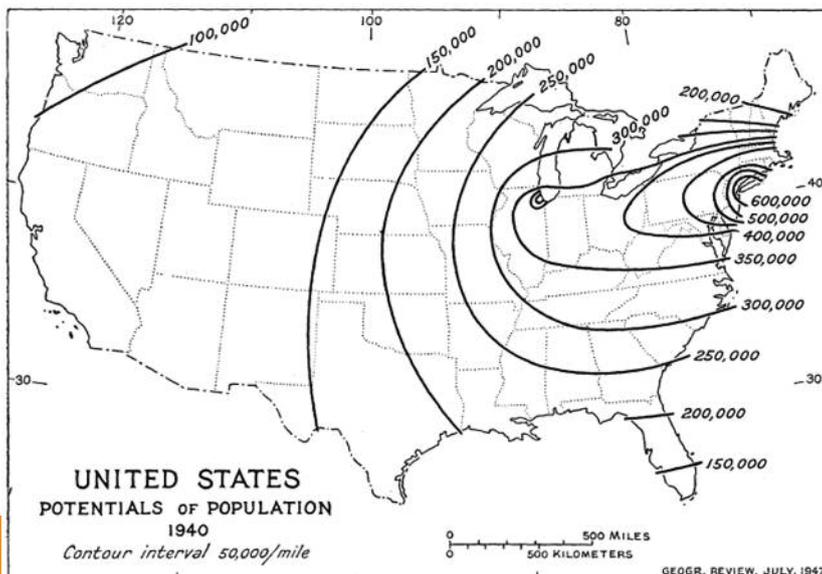
William Warntz and macrogeography

If there was a single American individual in geography who embodied the life of Cold War social science it was, perhaps, William Warntz. His was a serendipitous beginning, however. While a navigator in the US Airforce and based at Gander, Newfoundland (Canada), Warntz read a book at the base's library written by the Princeton physicist, J.Q. Stewart (1945), *Coasts, Waves, and Weather for Navigators*. Primarily a how-to manual for navigators, it contained an appendix – quite out of character with the rest of the book – in which Stewart applied the Newtonian potential model to the geographical distribution of terrestrial human population. Warntz became what can only be described as besotted by Stewart's appendix: subsequently it profoundly influenced his career, his intellectual trajectory, and the intellectual trajectory of American geography.

Stewart postulated that population potential provided a measure of the influence of the population at any given place on all other places. Stewart calculated this by recording the population sizes of all places, and their distances from all other places, and which be converted into a set of contour lines of 'equipotential' on a map of the USA (Figure 1). The higher the number on the contour line, the greater the population influence. For example, in Figure 1, because of their large populations and relatively short distances to other large population centres, sites on the US north-east seaboard have more influence than any other in the country. For example, they have greater population potential than places in the US Mountain States, which have few large cities and are more distant from large population centres.

In 1948 Warntz left the Airforce and went back to school, concerned to develop Stewart's idea of potential for geography. Moreover, Warntz believed the idea was applicable to issues other than population. He demonstrated this theory in his 1955 PhD thesis in which he deployed the Newtonian potential equations to represent the supply potential of various agricultural commodities (Warntz, 1955). Warntz (1957) called what he did 'macrogeography' – 'big geography' – a deliberate put down of Hartshorne's (1939) (small) regional geography, 'microgeography'.

Figure 1: United States potentials of population, 1940. Source: Stewart, 1947, p. 476.



In 1956, Warntz was appointed full-time researcher at the American Geographical Society based in New York, and took up adjunct positions at Princeton in J.Q. Stewart's Institute of Social Physics, and at the University of Pennsylvania at the newly-opened Department of Regional Science headed by Walter Isard – another exemplary Cold War social scientist.

Each of Warntz's institutional homes received Cold War military funding, as did Warntz as an individual researcher. In his case, he was funded primarily by ONR, receiving continuous grants from them until the early 1970s. ONR's 'Geography programme', established in 1948, favoured precisely the kind of large-scale collaborative projects that were technique-oriented, instrumental, and pursued by the new generation of scientific geographers represented by Warntz.

The research fitted perfectly the Cold War social science mandate. Warntz collaborated across several disciplines – geography, sociology, economics, planning and physics – all joined by their common aspiration of rigorous theory. Rather than theory for theory's sake, it was theory to get things done on the ground, to intervene. To do so required testing, calibrating, assessment of goodness of fit using large-scale data and cutting-edge statistical techniques. The modelling and the maths, however, could all be difficult, especially for geographers who had been in the scientific wilderness for so long. It was this that girded Warntz into pedagogical action: in summer schools organised both by regional science and by geographers he taught quantitative techniques and modelling protocol to the uninitiated; he broadcast a public-access radio programme that aired in New York City about his kind of geography; he presented a 20-hour television series on his local Philadelphia (PBS) station; and he wrote a textbook with Bill Bunge, entitled *Geography: The innocent science*. The latter came with such alluring props for students as a blow-up beach ball, colouring book and a home-made Varignon frame (Janelle, 2000). All of this activity was intended to produce subjects capable of undertaking macrogeography – Warntz's version of Cold War spatial science. Finally, there was also Warntz's relationship to Cold War 'machines'. It started early with Warntz writing a letter to John Stewart in 1953 asking if he could borrow the machine that Stewart had used to calculate his population potential maps (see e.g. Figure 1). Even the earliest and crudest potential maps could take months to prepare, requiring tens of thousands of individual calculations and completed using a slide rule, or, if you were lucky, a large thudding mechanical calculator. By the early

1950s, to make his calculations Stewart drew on the invention of a prize-winning Princeton electrical engineering student, Thomas Bissett, and it was Bissett's invention that Warntz wanted to borrow. However, Stewart would have none of it. He replied to Warntz, 'No Bissett here', and added, 'long-hand computation is not so bad'.¹ Once Warntz began actively to collaborate with Stewart, and as computers became more widely available (their power improving by leaps and bounds), Warntz's macrogeography project became ever more tightly tied to the machine. In 1964, using Princeton's IBM 7090 computer, Warntz reported that he was able to calculate potential maps for all 3105 counties of the conterminous US in less than two hours, and requiring 'billions of individual calculations' (1964, p. 171). Warntz went on to use the same computer to calculate the exact height of the 3105 nails he used to construct a three-dimensional plaster-of-Paris version of the same map, which was displayed at the 1964 New York World Fair (Janelle, 2000) (see Figure 2).

Conclusion

This article is concerned with how the larger external historical context of the 'High' Cold War period crucially shaped the internal make-up of American geography. In William Warntz's hands, geography was redefined. It was composed of new objects of analysis like 'equipotential' lines; new conceptual frameworks like 'macrogeography'; new theories like 'Newtonian potential equations'; new methods like 'statistical analysis' and 'computerisation'; and new philosophical underpinnings that were concerned with scientific explanation, prediction and intervention.

Warntz's work was only the beginning of the process of geography's transformation and the attempt to stabilise a new definition of the discipline. Not that it was uncontested, nor did it ever achieve full acceptance. Trying to discipline geographers, to make them conform to a single disciplinary definition of geography, has always



Figure 2: William Warntz in his living room measuring the height of 3105 nails for his 1964 three-dimensional 'US potential' map, for which he used Princeton's IBM 7090 computer. Photo: "William Warntz" *An Encyclopaedia of Human Thermodynamics, Human Chemistry, and Human Physics*, www.eoht.info/page/Willia+Warntz

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been fraught. For this reason the narrative in this article is likely to be seen as too neat and tidy, with its stories of the Cold War, American social science, American geography and William Warntz made to fit too snugly with another. The lives of academic disciplines and the lives of academics are rarely that well behaved. Nevertheless, they are always interconnected, which is, perhaps, the most important point to remember, and one which externalism emphasises. There are innumerable connections between what goes on inside a discipline and its larger external historical context. In his great Cold War novel, *Underworld*, Don DeLillo says: 'There are only connections. Everything is connected... world without end, amen' (1997, p. 825). This article is intended to show connections among the Cold War, social science, geography and the lives of geographers. Amen.

Note

1. Letter from John Q. Stewart to William Warntz, November 14, 1953, Box 36, J Warntz, W., John Q. Stewart Papers, Rare Books and Special Collections, Princeton University.

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