2.2.2 Physical geography in the Netherlands, 1978-1987

F.J.P.M. Kwaad

In 1964 Pattison defined four traditions in geography: (1) a "spatial" tradition, (2) an "area studies" tradition, (3) a "man-land" tradition and (4) an "earth-science" tradition. From the review of the history of physical geography by Gregory (1985) it appeared that, for a period of a hundred years (1850-1950), physical geography has belonged almost exclusively to the earth- science tradition in geography. Earth-science in this context has to be understood as the study of the history of the earth. Physical geography, therefore, wás a branch of the field of study we call "natural history". This was due to the influence of Darwin whose ideas on evolution were published in 1859. The effect of evolution was to impose upon physical geography a historical perspective, that was to become a predominant influence upon geomorphology, upon the study of soils and of biogeography, and also found parallels in the study of climatology for at least 100 years (Gregory, 1985). The evolutionary or historic-genetic approach was firmly established in physical geography by the work and writings of one man, W.M. Davis (1850-1934). The purpose of physical geography was viewed in this period as the evolution of landforms through time (the cycle of erosion) or the reconstruction of the past (denudation chronology). By 1950 this paradigm (Kuhn) or research programme (Lakatos) was exhausted. Physical geography began to look for a new focus. At first, this focus was found in measurement and quantification and physical geography became more "scientific". Measurements and quantification, however, cannot constitute the subject matter of a science. They are aspects of the methods and techniques of a science. Thereupon the focus was sought in the measurement of present-day landscape-forming processes. This was a natural outcome of the criticism, which had been raised long ago against the cycle of erosion (the Davisian approach). Although Davis stressed that landforms are a function of structure, process and time, next to nothing was known of the landscape forming processes. He nevertheless claimed to be able to deduce the sequential development of landforms through time. Clearly, studies of processes had to be undertaken as a necessary condition for the establishment of quantitative relationships between process and form. It soon appeared, however, that time scale constitutes a problem. The dependency of form on process is only apparent after long periods of time (10^3 years and more). During shorter time spans the relationship is reversed: form is a control of process i.e. process depends on form. It also appeared that a state of dynamic equilibrium or a steady state can be achieved over a certain period of time, during which period landforms do not change, although processes are actively going on moving rock and soil material across the landscape (Schumm and Lichty, 1965).

This insight in the time-independency of landforms over shorter time spans gave rise to the approach in physical geography in which the physical landscape is viewed as a "system" (Chorley and Kennedy, 1971). It was realized that there is an interdependency of elements throughout the landscape and that the behaviour of the landscape is governed by feedback relations. Physical geographers became more and more interested in the present-day landscape and became more and more aware of its present-day functioning. At the same time a revival of environmentalism occurred in geography: an interest in the relationship between man and his physical environment. In the nineteenth century this interest is centred upon the possible influence of the natural environment upon man's behaviour (geographic determinism and possibilism). During the second half of the twentieth century the interest was concentrated on the reverse relationship, the influence of man on his natural or physical environment. This revival of the man-land tradition in geography is due to the phenomena of environmental degradation, pollution and ecological disturbance which constitute some of the major problems with which society is faced today. This applies as much to the western world as it does to the developing nations. In the third world the problem is more acute because there the land resources upon which the majority of the population depend for a living are threatened by environmental degradation such as soil erosion and desertization (Jungerius et al., 1985; Jungerius et al., 1986).
The interest in present-day landscape characteristics and environmental degradation constitute an important focus for modern physical geography. The aim is to establish the laws which allow predictions of the effects of alternative courses of action to be taken by man in order to preserve the earth as a place fit to live in.
This is not to say, that the earth-science tradition has been completely abandoned, far from it. Physical geographers continue to study the development of the landscape through time aided by new dating techniques. Much can be learned from this. The long-term effects of certain conditions can only be established by studying such conditions over the long term in the past. For instance, the way in which a rising sea level affects low lying coastal areas can be found out by studying locations where this has taken place. Trends can be extrapolated into the future. Areas which are sensitive to certain natural hazards such as land-sliding and avalanches, can be localized by studying the remnants of former events in those areas. Risk maps can be constructed based on historical evidence of this kind.

Developments in physical geography in the Netherlands must be viewed against the general background that has been sketched in a rough outline in the foregoing, based on the recent book on the history of physical geography by Gregory (1985). Dutch physical geographers have been active in various branches of physical geography during the past 10 years. The results of their work during the period 1978-1987 therefore shows great diversity in subject matter. This makes

it difficult to characterize physical geography in the Netherlands during the period under review in a few general statements. However, the following trends and/or areas of interest can be discerned. Physical geography in the Netherlands has become more practice-oriented over the past 10 years than it was before. This trend towards a more practical orientation started around 1970. The change in attitude of Dutch physical geographers had various causes. Partly it is due to the inclusion in 1965 of soil-science in the study of physical geography at one of the three universities in the Netherlands where physical geography is taught, the University of Amsterdam. Soil-science led to an interest in soil as a natural resource, a land resource. Together with interest in land-use this led to studies in the field of land evaluation, land resources planning, land capability classification etc. by physical geographers (Vink, 1975). The development of landscape ecology from 1966 within physical geography in the Netherlands can also be traced back to roots in physiographic soil surveys and integrated surveys (Vink, 1983). Both developments (land evaluation and landscape ecology) in physical geography in the Netherlands clearly arose from practical needs of society and, as such, belong to the man-land tradition in geography (Jungerius, 1985). These needs have to do with land resources inventorisation and management, regional and rural planning, environmental degradation and pollution, nature and landscape protection and conservation. Part of the stimulus towards more practice oriented research by physical geographers in the Netherlands has to do with funding of the research. Increasingly, over the past ten years, funds for research have become scarcer due to the attempts of universities to economise. At the same time research has become more expensive due to the use of sophisticated instruments for field measurement and monitoring programmes such as automated recording equipment, and for laboratory analyses of soil and water samples. Expensive computer facilities are also required by modern physical geography for data analysis, simulation models, Geographical Information Systems (GIS) etc. Increasingly, therefore, one is forced to find funds for research programmes outside the university. This influences the choice of research topics which are then more practice-oriented, but at the same time it can contribute to physical geography gaining more prestige in the eyes of society. Such image improvement, if it were to occur, would be very welcome.

Dutch physical geographers have, during the past ten years, taken part in the world wide "movement" of measuring present-day landscape forming processes. By these means they have become better equipped to analyse the causes of present-day environmental degradation (Imeson, 1987). Amongst the processes studied have been: mass wasting processes (and related geotechnical slope stability aspects), zoogenic movement of soil material along slopes, rain splash and slope wash processes on forested and agricultural slopes including related erodibility characteristics of soils (infiltration capacity, aggregate stability), river bank processes, sediment

budget and related hydrologic measurements in small drainage basins, eolian processes, glacial processes and processes along coasts.
The earth-science tradition in geography has not been neglected by Dutch physical geographers over the past ten years. Many papers have appeared on two topics which relate to the specific physical geographical situation in the Netherlands: (a) the greater part of the physical landscape of the Netherlands is a legacy of the Pleistocene ice ages; many features with a glacial or periglacial origin occur in the Netherlands, (b) the western and northern part of the Netherlands is the product of a rising sea level during the Holocene; many studies have appeared on the stratigraphy and sedimentology of the marine deposits in these parts of the Netherlands. Recent coastal processes along the Dutch coast, so important for coastal defences, are discussed in a separate chapter.
Dutch physical geographers have also been engaged on studies of landscape evolution abroad, both in Europe and other continents.

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