Sociolinguistics
Soziolinguistik

An International Handbook of the Science of Language and Society
Ein internationales Handbuch zur Wissenschaft von Sprache und Gesellschaft

2nd completely revised and extended edition
2., vollständig neu bearbeitete und erweiterte Auflage

Edited by / Herausgegeben von
Ulrich Ammon · Norbert Dittmar
Klaus J. Mattheier · Peter Trudgill

Volume 3 / 3. Teilband

Offprint / Sonderdruck

Walter de Gruyter · Berlin · New York

guage Variation and Change, Peter/Schilling-Estes, Natalie, eds., Oxford, 707–728.

–/Gordon, Elizabeth/Lewis, Gillian/Maclagan, Margaret (2000) "Determinism in new-dialect formation and the genesis of New Zealand English", in: *Journal of Linguistics* 36, 299–318.

van Langenvelde, Ab (1993) "Migration and language in Friesland", in: *Journal of Multilingual and Multilingual Development* 14 (5), 393–409.

White, Paul (1980) "Migration loss and the residual community: a study in rural France 1962–75", in: *The Geographical Impact of Migration*, White, Paul/Woods R.I., eds., London.

– (1993) "The social geography of immigrants in European cities: the geography of arrival", in: *The New Geography of European Migrations*, King, Russell, ed., London, 47–66.

Zelinsky, Wilbur (1971) "The hypothesis of the mobility transition", in: *Geographical Review* 61(2), 219–249.

Zentella, Ana Celia (1990) "Returned migration, language, and identity: Puerto Rican bilinguals in dos worlds/two mundos", in: *International Journal of the Sociology of Language* 84, 81–100.

Paul Kerswill, Lancaster (Great Britain)

230. Sociolinguistic Developments as a Diffusion Process
Soziolinguistische Entwicklungen als Diffusionsprozesse

1. Introduction

For centuries linguists have been aware of the parallels between linguistic and social phenomena. They did not realize, though, until the sixties of the 20th century, that adopting the methodology and concepts of the social sciences in linguistics could help to understand the relationships between linguistic and social patterns of variation. Labov's studies of the social stratification of sound changes in Martha's Vineyard (Labov 1963) and in New York (1966) have given the impetus for adopting sociological concepts and models for the description and explanation of linguistic differences. The idea that spatial patterns of linguistic phenomena have to do with geographical factors such as roads, mountains, rivers, swamps, etc., is even older than the presumed co-variation of linguistic differences and social factors. Human geography made clear how geographical and social factors interact. In the seventies of the last century, sociolinguists applied tools and theories from human geography to analyse geographical distribution patterns of linguistic phenomena, including variation between dialects. The concept of diffusion turned out to be pivotal in connecting linguistic and geographical patterns. This article will deal with those so-called diffusion models, in which linguistic innovations are transmitted through space. A diffusionist approach emphasizes external, social sources for explaining language variation (Chambers 1995), which does not mean that internal, linguistic factors do not play a prohibiting or fostering role. Gravity models were included in this article, because they were applied in sociolinguistics to analyse spatial diffusion patterns of linguistic features. Hernadez-Campoy (1999) nevertheless states that the relationship between sociolinguistics and geography is far from being ideal. Bailey/Wikle/Tillery/Sand (1993, 360) state the sociolinguistic obsession towards the social structure of urban language communities in the following way:

> "The lack of work of spatial diffusion is primarily a result of two things: the difficulty in obtaining reliable data over an area broad enough to allow for the study of the spread of a feature in space and the interest of variationists in isolating the locus of change in the social structure of the (generally urban) speech community."

2. Historical forerunners

The first large dialect survey to study the spatial diffusion of linguistic variants was held in Germany between 1876 and 1887 by Georg Wenker. Data and maps are now-

adays available through internet ('Digitaler Wenker Atlas'; www.diwa.info). Wenker was presumed to be motivated to test the Neogrammarian claim of regular sound change (cf. Niebaum 1983, 30). Since the first results of this dialect survey already contradicted the neogrammarian claim, most dialectologists left linguistic theories for what they were and confined themselves to the description of geographical patterns of individual linguistic features. The resulting dialect maps were for most dialectologists the ultimate goal they had set themselves. Some, however, moved a step further and wanted to explain the spatial patterns observed. The types of explanations given can be roughly divided into internal and external explanations.

The famoust example of an internal linguistic explanation in dialectology is Gilliéron's observation that for the concept 'cock' words were used in the whole of France derived from the Latin word 'gallus', except for the south-western part, Gascogne. He ascribes this geographical pattern to the fact that Gascogne is the only region in France where both the sound changes *g* > *c* and *ll* > *tt* have taken place. In combination, they would have changed 'gallus' variants into 'cattus', having the consequence that 'cat' became homonymous with 'cock'. This rather inconvenient merger was counter-acted by adopting a different word for 'cock'. Comparable internal linguistic explanations were not very frequently put forward, since spatial distributions of linguistic phenomena often do not coincide in such a perfect way. And, in addition, if they do, one can most of the times not be sure whether the occurrence of phenomenon A indeed caused the occurrence of phenomenon B. Dialectologists will have to resort far more often to external factors to explain spatial diffusion patterns of specific linguistic features. Two different types of diffusion need to be distinguished (a) migration or colonization, and (b) borrowing. The spatial re-distribution of a linguistic feature (or, in the extreme case, of a complete language variety) caused by migration or colonization is called relocation diffusion in human geography. Figures 230.1a and 230.1b visualize this process. The spatial pattern changes because the 'carriers' of the linguistic feauture involved move.

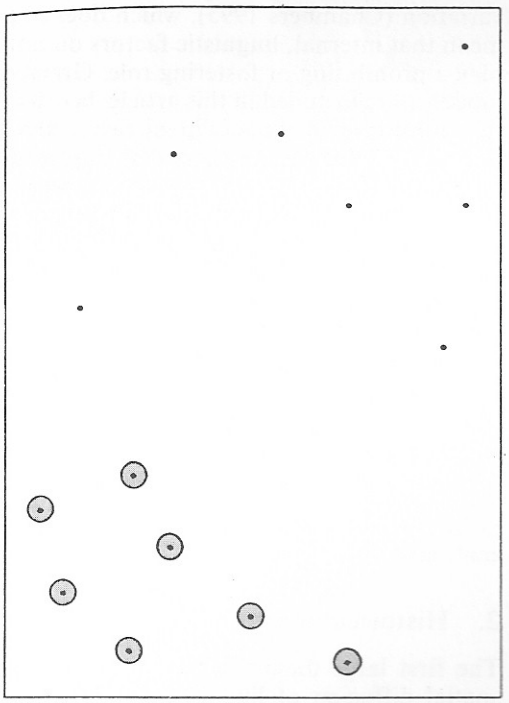


Fig. 230.1a: Relocation diffusion: the initial stage (from Abler/Adams/Gould 1977, 391)

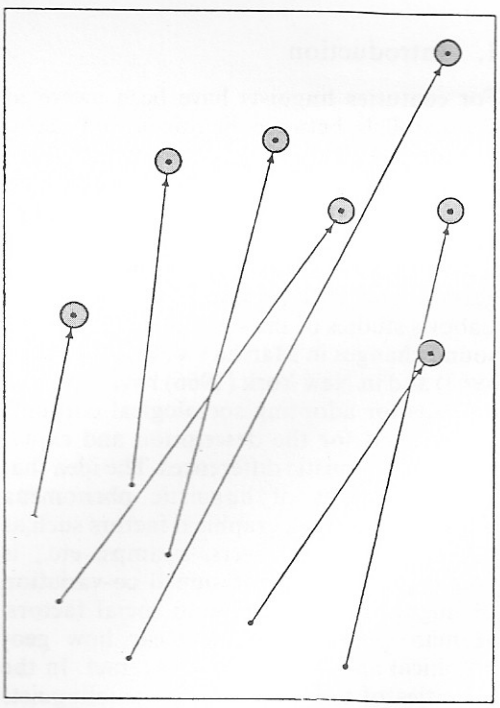


Fig. 230.1b: Relocation diffusion: a later stage (from Abler/Adams/Gould 1977, 391)

The second type of diffusion proceeds by speakers adopting through contact linguistic features from other speakers. The feature is spreading, not its 'carriers'. Such a process is called expansion diffusion in human geography. Figures 230.2a and 230.2b visualize this process. This type of diffusion is also known in sociolinguistics as the wave model. It is related as well to epidemic models as developed in biology.

A beautiful dialect-geographical example of both relocation and expansion is shown in map 230.1 from Kloeke (1927). Map 230.1 shows the geographical distribution of three variants of the vowel in the word 'muis' (= *mouse*) in the Dutch language area and part of Germany.

The oldest variant is the *[u.]* (= Westgermanic û), which can be found in the eastern part of Map 230.1, including Germany. Its successor, the *[y.]*, can be found in the middle of the map, in an area neighbouring the *[u.]* area. Secondly, it can be found in the southwest area, bordering the sea. The youngest variant, which is the variant used in standard Dutch as well, is the diphthong *[oey]* and this variant is found over the whole middle area of the map. The map configuration seems to be caused by expansion diffusion by which the oldest variant *[u.]* is superseded by the *[y.]*, succeeded by the expansion of the youngest variant *[oey]*. There are two problems in the spatial distribution of Map 230.1. First of all, the middle area is a complete *[oey]* area which raises the question why this distribution is running from up north to down south. Here relocation diffusion comes in. The change *[u.]* → *[y.]* originated probably in Flandres and spread in the Middle Ages over a large parts of the Dutch language area. The change *[y.]* to *[oey]* originated in Flanders, but at the same time it appears in the area of the provinces of Holland, including Amsterdam. A point of discussion is whether the diphthong variant is exported to Amsterdam and other cities after the fall of Antwerp in 1585 when many people from the Antwerp area moved to the Netherlands (the United Low Countries in that time). The further expansion of the *[oey]* can be attributed to the provinces of Holland, by far the most powerful provinces in that time. Expansion diffusion of changes is explained by Kloeke (1927) as the outcome of a pro-

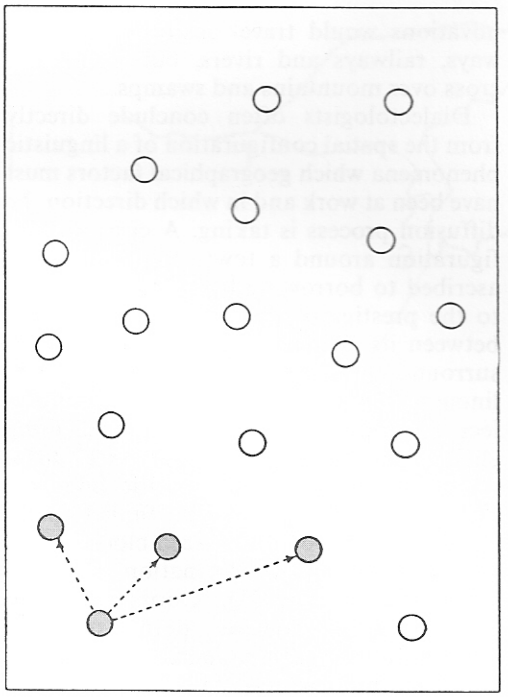


Fig. 230.2a: Expansion diffusion: the initial stage (from Abler/Adams/Gould 1977, 390)

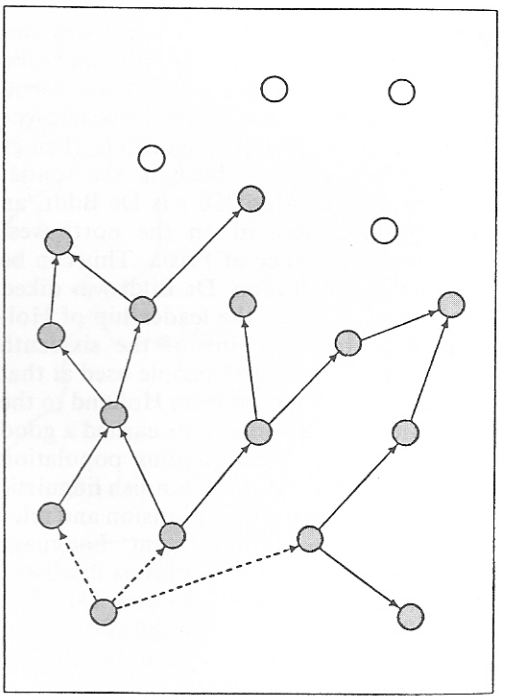
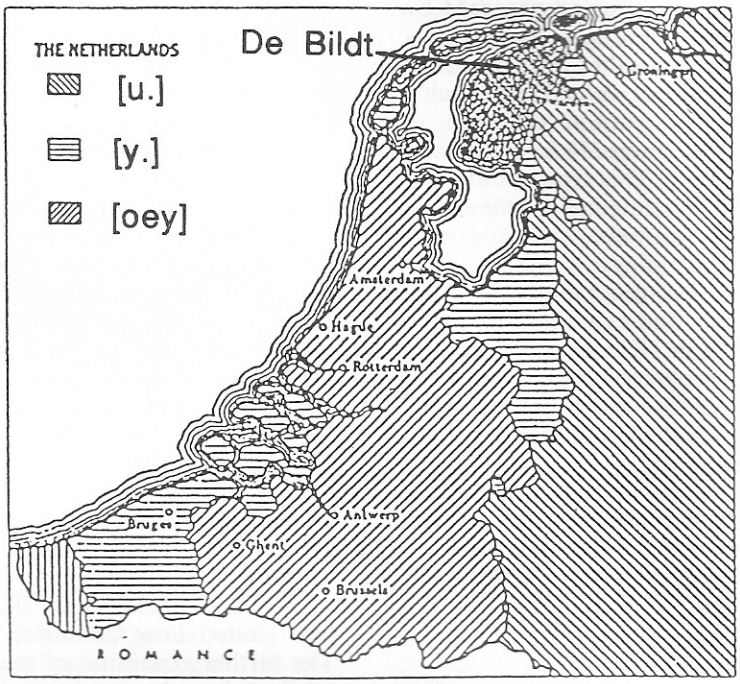


Fig. 230.2b: Expansion diffusion: a later stage (from Abler/Adams/Gould 1977, 390)



Map 230.1: Distribution of the three main variants of the vowel in the word 'muis' (= *mouse*) in the dialects of the Dutch language area and the neighbouring part of Germany, after Kloeke (1927).

cess where less powerful speaker copy linguistic features of more powerful speakers. He borrowed the concept from his friend Frings who wrote the German masterpiece in the field of dialect expansions (Frings 1926). The second problem in the spatial configuration of Map 230.1 is De Bildt, an *[y.]* speaking area in on the north-west coast of the province of Frisia. This can be explained by migration. De Bildt was diked in and settled under the leadership of Hollanders at the beginning of the sixteenth century. The Hollandish people used at that time an *[y.]* and took it from Holland to the Bildt. Since these immigrants earned a good reputation, the autochthonous population adopted this and other Hollandish linguistic features. As it turns out, expansion and relocation often go hand in hand. Language change as a result of relocation is discussed in the articles 223, 226, 229 and 231. This article focuses on expansion diffusion in the context of dialect-geography and sociolinguistics. Dialect geographers like to explain expansion diffusion on the basis of straightforward geographical factors. Linguistic innovations would travel easily along highways, railways and rivers, but would not cross over mountains and swamps.

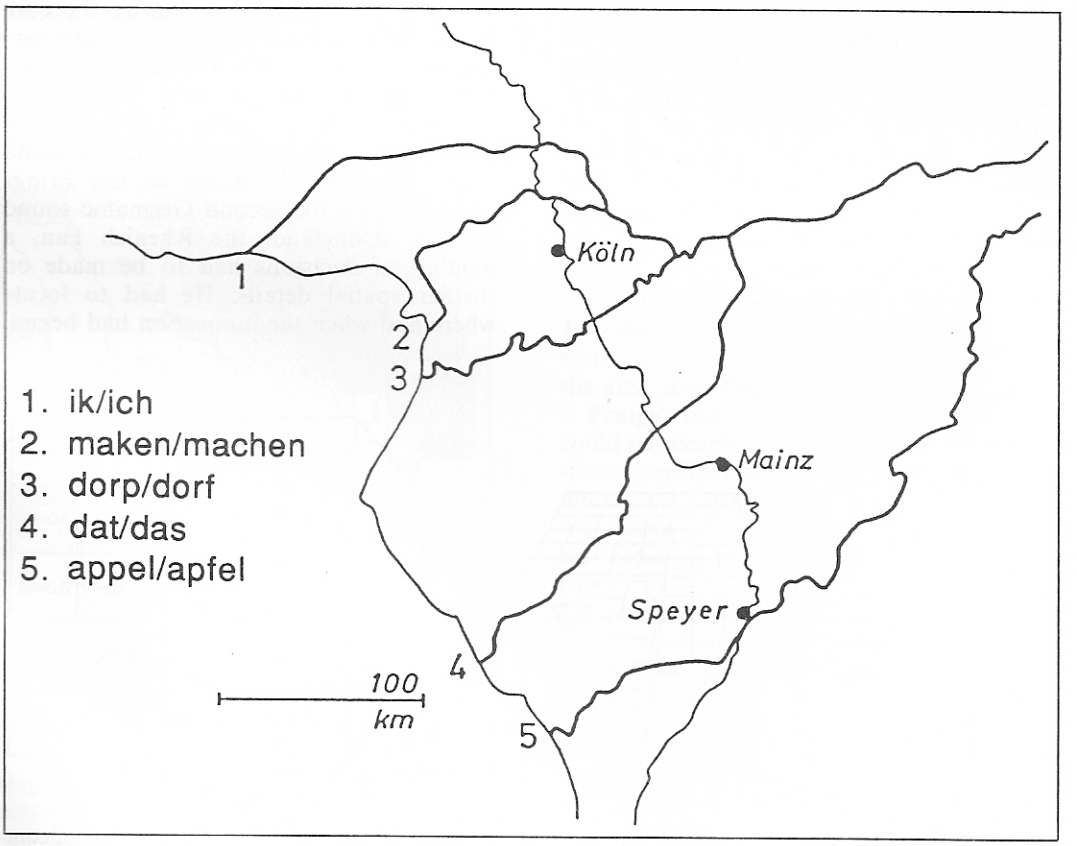
Dialectologists often conclude directly from the spatial configuration of a linguistic phenomena which geographical factors must have been at work and in which direction the diffusion process is taking. A circular configuration around a town, for example, is ascribed to borrowing from that town, due to the prestige of the city, and to contact between its citizens and the inhabitants of surrounding villages. There are a number of linguistic landscapes that according to dialect geographers can be interpreted along such lines of argumentation. Colourful names are made up for specific linguistic landscapes, like mushroom, funnel, pineapple, shattered block, pierced block, crone, ribbon, and terrace formation (Weijnen 1977; Goossens 1977). Goossens (1977, 76–93 passim), however, points out that straightforward geographical explanations need to be corroborated by additional sources of evidence, especially historical linguistic sources.

3. Testing expansion diffusion: a computer simulation

Several programs on the internet quickly show how competing forms can diffuse over an area of communicating entities. With a simple rule that neighbours prefer to be alike and that they inform each other, stable borderlines between fixed areas evolve (see also Keller 1994, 101 ff). Such computer simulation models have a history, going back to the work of the human geographer Hägerstrand (1953, 1967). Computer simulation models have the advantage of making it possible to compare spatial patterns predicted by some model and the spatial patterns observed in reality. Hard (1972) was the first who draws dialect geographers' attention to such models from human geography. He used a computer simulation model to test Frings' theory about the origins of the so-called Rhenish Fan, an implicational spatial pattern of related sound changes. The spatial pattern spatial is given in Map 230.2.

The Rhenish Fan in Map 230.2 comprises the geographical distribution of the reflexes of Germanic **p*, **t* and **k* in Rhineland in Germany. Those sounds remained stops in Low German (spoken in the Northern part of Germany), but have changed into fricatives and affricates in High German (spoken in the southern part of Germany). The *p/pf/f, t/s* and *k/ch* isoglosses coincide going from east to west Germany, but at a certain point in the west of Germany, they take different tracks, splaying out like the spokes of a fan. According to Frings (1922), this spatial pattern is the outcome of an innovation originating from the southern part of Germany in the tenth century after Christ. Hard (1972) uses a simulation model developed by Hägerstrand (1953, 1967) to test this hypothesis. Hägerstrand's model has several core characteristics (cf. Abler/Adams/Gould 1977, Chapter 11):

a. The potential adopters of an innovation are spread evenly over space and an innovation can move with equal ease in any direction.



Map 230.2: The Rhenish Fan (from Hard 1972, 48)

b. An innovation is only adopted in face-to-face interaction (direct contact with neighbouring persons).
c. When a person comes into contact with an innovation in face-to-face interaction, he will adopt it with a certain probability.
d. The probability of passing an innovation from one person to another is smaller the larger the distance between them.

The model is implemented as follows. Each person (or entity) is the center of a so-called Mean Information Field (MIF), a communication field that is strong close to him, but gets weaker as distance decreases. The precise values in this Mean Information Field are calculated by taking into account factors as distance, kind of society, etc. (see Abler/Adams/Gould 1977, 413). Figure 230.3 shows how the estimate of the MIF is translated into an operational form.

The Mean Information Field in Figure 230.3 takes the form of a small, square grid of twenty-five cells, the sizes of which are the same as those of the grid lying over the map. Assuming that the teller is located in the middle of the cell, for each of the twenty-five cells in the MIF a probability of adoption of an innovation is calculated on the basis of distance. The center cell in Figure 230.3 received for example a value of 0.4432. This means that every time that the teller passes a message there are 4432 chances out of 10000 that the message will go to someone else within the same middle cell. The corner cells of the floating grid are far away, though, and the chances of a message passing to people in these remote locations are much lower. A probability of 0.0096 is calculated or 96 chances out of 10000. The centre cell of the Mean Information Field is placed exactly above the cell where according to actual data an innovator is found. Subsequently a number is drawn at random and this number locates the cell of the next adopter. A person in this cell adopts the innovation and the MIF moves on, continuing to scan each of the cells of the map in turn, stopping over each innovator and generating a new adopter of the innovation. One complete pass over the map constitutes one time period or generation of the diffusion process. Then the MIF starts again, stopping twice as often during the second generation and so on. As one generation follows another, a pattern of diffusion develops from the initial assignment of the first few innovators to the population cells. In this way, the model simulates diffusion through time and space. Notice that every time we run the model we can get slightly different results because of its probabilistic nature. We simplified the description of the model to clarify the core characteristics. With the help of computers the model can be refined easily: geographical and psychological barriers can be introduced, populations can be varied from cell to cell, and so on. Before Hard (1972) could apply Hägerstrand's model to test Frings hypothesis on the second Germanic sound shift in Rhineland, the Rhenish Fan, a number of decisions had to be made on further spatial details. He had to locate where and when the innovation had begun.

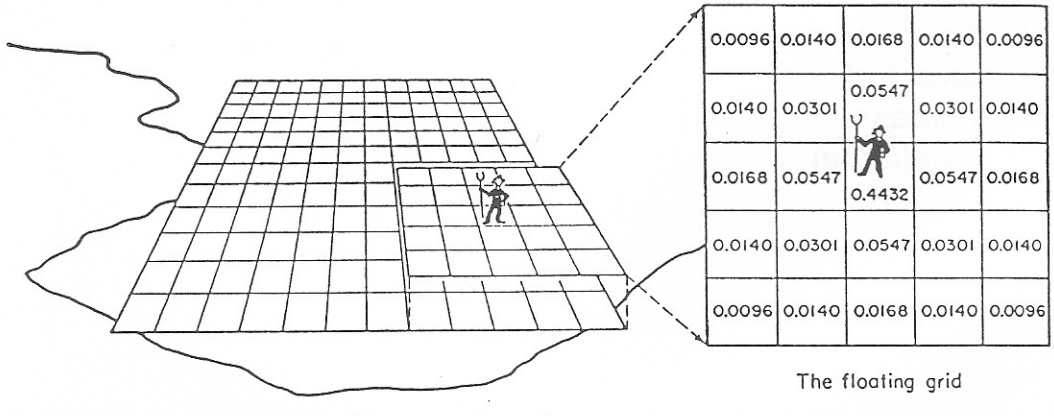
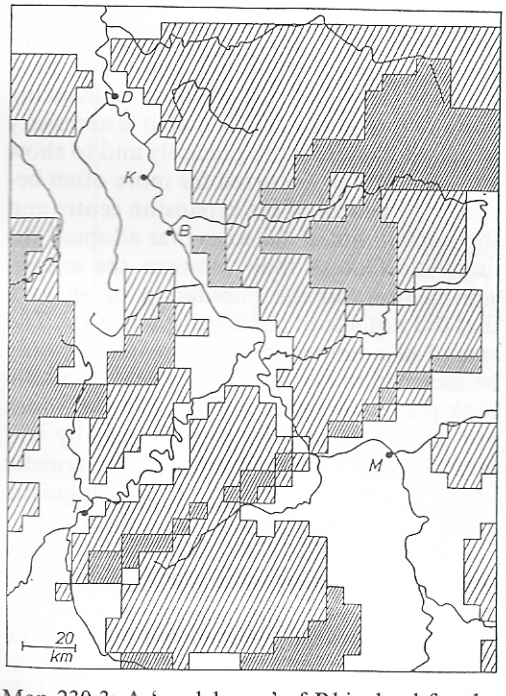
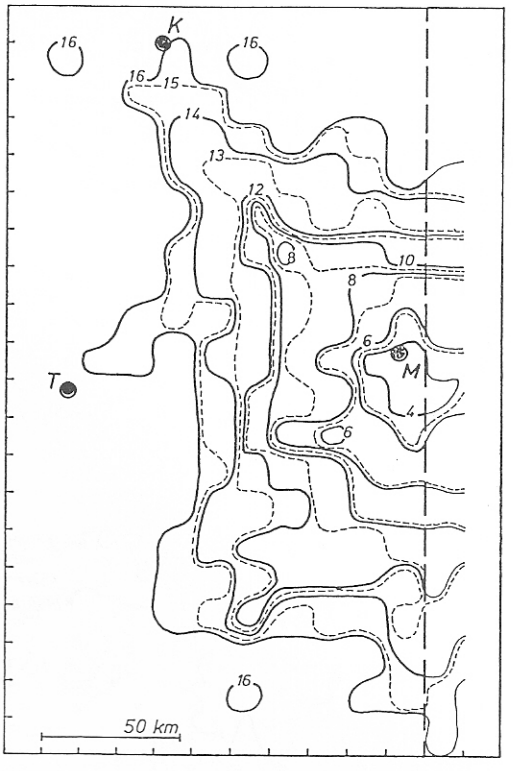


Fig. 230.3: The mean information field as a floting grid of twenty-five cells with the probabilities of communication assigned (from Abler/Adams/Gould 1977, 414)

In accordance with Frings' theory Mainz and surroundings were taken, in the early Middle Ages. Next, Hard had to fix the number of generations. Again in line with Frings' theory he took the period from the early to the late Middle Ages (16 generations). Thirdly, he had to determine in how many cells the area under investigation had to be divided in order to be able to simulate Frings' claims as faithfully as possible. Hard took 1500 to make the simulation detailed enough. Finally, it was decided to use barriers in the map of the model, which meant that a map of Rhineland in the early Middle Ages with barriers had to be constructed. Hard did so by investigating the data of a number of existing maps and historical studies of this area. The result was Map 230.3, in which the cells with barriers are hatched. He distinguished hard and weak barriers. This was incorporated in the model as follows. Persons in cells without barriers adopted an innovation as soon as the model had sampled them, but persons in weak barrier cells had to be sampled twice before they adopted the innovation, and those in hard barrier ones had to be sampled four times.



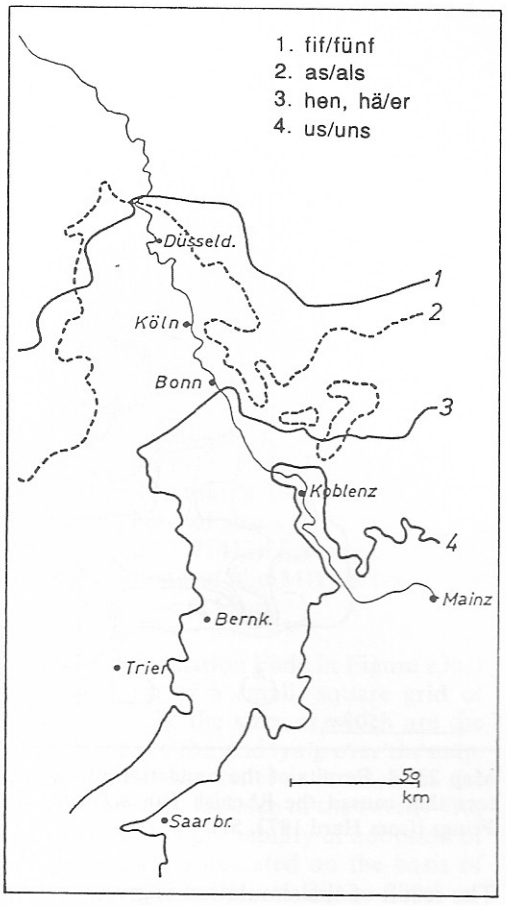
Map 230.3: A 'model map' of Rhineland for the early to late middle ages. 'Weak' and 'hard' barriers are characterized by lighter and darker hatches (from Hard 1972, 51).



Map 230.4: Results of the simulation of the factors that caused the Rhenish Fan according to Frings (from Hard 1972, 57).

The result of the simulation is given in Map 230.4. The so-called isolines in Map 230.4 indicate the areas in which the innovation has been adopted. The isolines range from from the 4th (the inner area, only Mainz plus surroundings) to the 16th generation (the largest area, just not including Köln) and they show how the innovation is spreading over the area according to the simulation model.

Frings' theory about the Rhenish Fan could be accepted if Map 230.4 would have a spatial configuration that resembles the configuration of Map 230.3. This is anything but true, though. In such a case one has an option between repeating the simulation with a more refined model, hoping that the resulting map will resemble better or conclude that the factors incorporated in the model have nothing to do with the spread of the phenomenon under investigation. Hard gives two reasons for taking the last option. The differences between the actual geographical distribution and the map predicted by the simulation model are too large to be remedied by refining the model. Furthermore, Hard presents Map 230.5 with four other isoglosses.



Map 230.5: Diffusions from the southern part of Germany (from Hard 1972, 47).

The isoglosses in Map 230.5 are changes of which it is well-grounded that they originated in the south in Middle German. These patterns clearly resemble the patterns found in the simulation model as can be seen in Map 230.4. This additional source of evidence leads to the rejection of Frings' theory. Hard (1972) rejects Frings' theory about the origins of the Rhenish Fan. Schützeichel (1961) has an alternative theory. He ascribes the Rhenish Fan to an autochthonous development in the Rhineland at the end of the 8th century after Christ. To test this theory, a new simulation model need to be implemented and, again, maps predicted by the model, need to be compared to the observed geographical distribution. Simulating geographical expansion diffusion seems to offer attractive possibilities to test theories of expansion in dialectology. Unfortunately, despite Hard's appealing example, no other human geographer's or dialectologists have implemented complex simulation models. From a sociolinguistic viewpoint, one would like to have simulation models that could somehow incorporate more complex social configurations.

4. Additional factors in explaining expansion diffusion

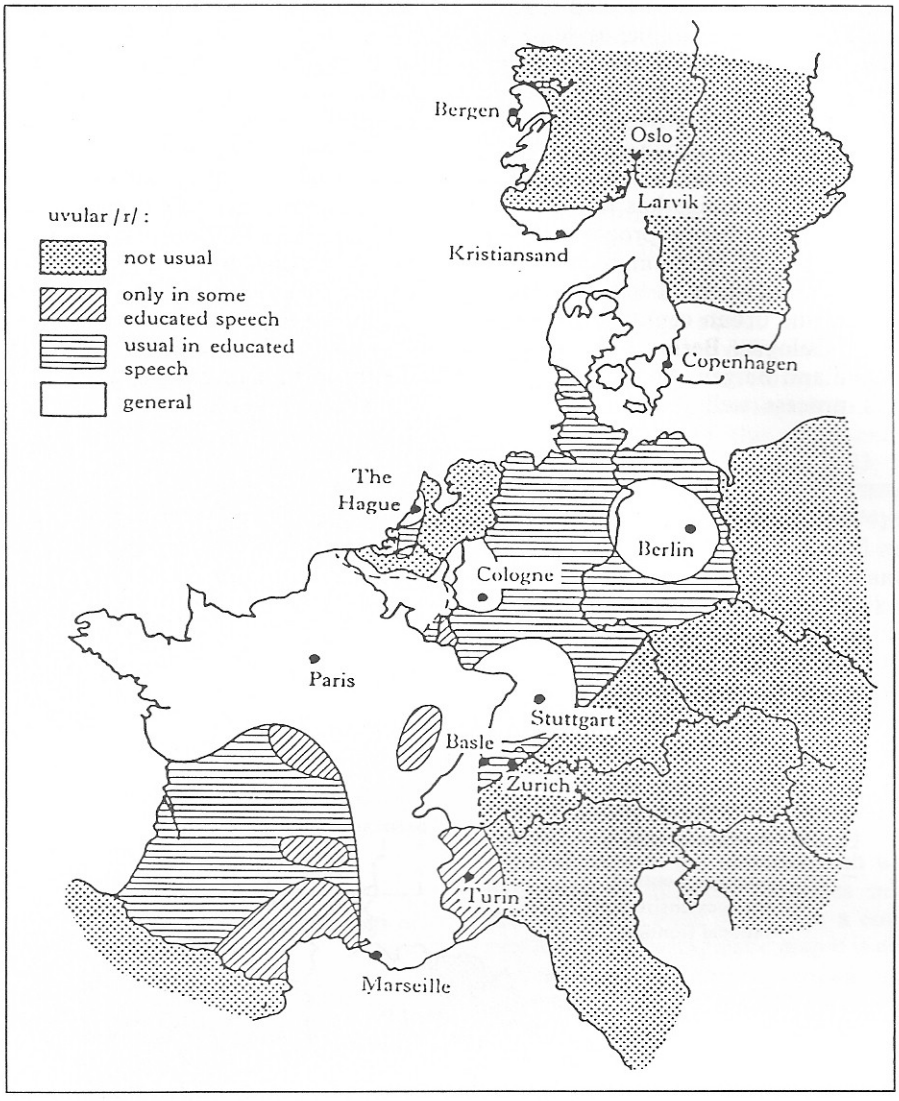
Although dialect geographers had uncomfortable feelings about the their explanations of expansion diffusion, more precise points of criticism were only formulated in the seventies. Dialectologists tried to get dialectology out of this dead end (Hard 1972; Trudgill 1974; Trudgill 1983; Thomas 1975; Gerritsen/Jansen 1980). Particularly the points raised by Trudgill (1974) are still relevant today, because an overall model of language contact and the origins and diffusion of language changes is still lacking. The points of criticism centre on the incorporation of sociological and social-psychological factors in processes of geographical expansion diffusion.

4.1 The geographical factors fostering or inhibiting diffusion are too loosely defined. All geographical factors that are given to explain spatial diffusion can de facto be reduced to one: the easiness with which inhabitants of different localities may have contact which each other. For a convincing explanation of a linguistic map it is necessary to define contact more precisely and to show that it occurs or occurred far more often between the people of the expansion centre and the inhabitants of the area that adopted the linguistic feature than between the expansion centre and the population of an area that did not adopt the linguistic feature. The spread of a linguistic phenomenon can only be ascribed to borrowing if contact actually took place. Intensive contact, however, does not guarantee that borrowing actually will take place, since adoption of a new linguistic form requires specific sociological, linguistic and psychological conditions.

4.2 Social and stylistic factors that may play a role in the spread of linguistic phenomena are neglected. Dialect geographers restricted themselves traditionally to the study of the dialect of the 'best dialect speakers of the place'. Trudgill (1974, 217–221) shows that spatial distribution patterns could not be explained because of the lack of social or stylistic details. The distribution of

the uvular /r/ in Europe in educated speech (see Map 230.6), for example, is hard to understand, but additional socio-stylistic information as given in Map 230.7 gives a better insight in the patterns of diffusion. Map 230.7 shows that urban centres have played an important role in the spread of the uvular /r/. The change has taken place through a gradual diffusion process around major cities in France, Belgium, Switzerland and Germany; elsewhere it seem to have jumped from one urban centre to another: The Hague, Cologne, Berlin, Copenhagen, Kristiansand and Bergen. Jumping between cities is a process well known in human geography and it is called hierarchical diffusion. Trudgill gives evidence for a process of hierarchical diffusion, a diffusion type well-known in human geography, and often added to expansion and relocation diffusion. It is in fact seen as a variant of expansion diffusion. Britain (2002) points out that urban hierarchical diffusion is found in several studies (e. g., Bailey/Wikle/Tillery/Sand 1993; Horvath/Horvath 1997), without accepting that hierarchical diffusion is a special variant of expansion diffusion. Hernández-Campoy (1999) mentions the central place theory in human geography to account for processes of hierarchical diffusion.

Map 230.6: Uvular /r/ in Europe (from Chambers/Trudgill 1980, 186).



Map 230.7: Uvular /r/ in greater social details (from Chambers/Trudgill 1980, 191).

4.3 Speakers' and listeners' attitudes are not sufficiently dealt with. Dialect geographers did hardly pay attention to attitudes. It seems reasonable to assume that attitudes are important and that positive attitudes towards a linguistic feature will stimulate adoption, whereas negative attitudes will prohibit it. Metropolean areas usually are centres of linguistic expansion, but many typically New York City forms are confined to the city itself. Labov (1966, 499) writes that New York City linguistically is 'a great sink of negative prestige'. We need, however, more research on the relationship between linguistic attitudes and language behaviour. Research results are far from being equivocally, even not in social psychological research in general on the relationship between attitudes and behaviour. A different aspect to be mentioned here is the way linguistic features are mapped. Traditional dialect maps are straightforward, using plain symbols or isoglosses. They do not incorporate other sources of information or information on the presence of variation in the linguistic feature investigated. Quantitative maps, containing information on the frequency of occurrence of a certain phenom-

enon, can be found more and more in modern dialect geography, which is interesting especially when social processes are involved. Britain (2002) gives several examples of quantitative maps. An important publication is Kretzschmar/Schneider (1996).

5. The gravity model

Gravity models are common in human geography for explaining a wide range of flow patterns, e. g., migration, telephone traffic, passenger movements, and commodity flow. Such models can be used to explain the flow of linguistic features as well. Gravity can be defined as the degree of attraction between places. The gravity model is attractive as a geolinguistic model because of the relative simplicity of its application. Trudgill (1974) was the first to use a gravity model to explain processes of linguistic diffusions in Norway and England. Callary (1975) did so in Illinois and Gerritsen/Jansen (1980) applied it to explain the spread of an Amsterdam dialect feature in the Netherlands. The gravity model in its simplest form is given in (1).

(1) $M_{ab} = (P_a P_b)/(d_{ab})^2$

where M_{ab} = the number of interactions between a and b during some time period
d_{ab} = the distance between a and b
P_x = size of population x

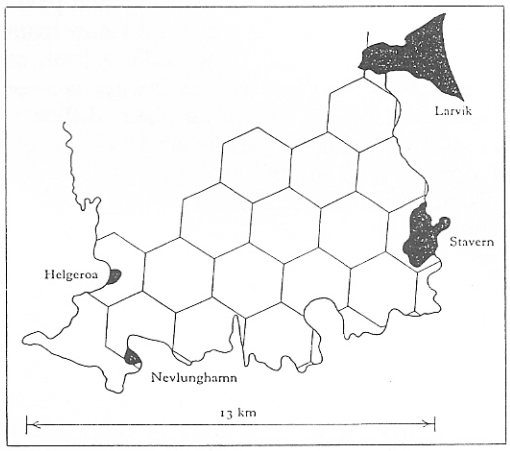
Formula (1) states that the degree of interaction or exchange between place 'a' and place 'b' can be expressed as a function of the population sizes of both places divided by their squared geographical distance. Data about distance and population sizes are often easy to obtain. Model (1) can be specified, to determine the influence (= I) of place a on place b, which is different from the influence or impact of place b on a. The formula is given in (2).

(2) $I_{ab} = (P_a P_b)/(d_{ab})^2 . (P_a/(P_a + P_b))$

In addition, it is possible to incorporate that linguistic features are most easily adopted from dialects that resemble each other than form dialects which are linguistically dissimilar. A factor s, expressing linguistic similarity, can be added. This gives the formula given in (3).

(3) $I_{ab} = s . (P_a P_b)/(d_{ab})^2 . (P_a/(P_a + P_b))$

Trudgill used the gravity model in combination with a human geographical and sociolinguistic methodology of data collection to explain the geographical distribution of linguistic phenomena in Norway and England. The Norwegian study was carried out in Brunlanes, a small rural peninsula on the south coast of Norway, surrounded by the sea on three sides and bordered in the north by a wooded area with no roads of any consequence. Thanks to this isolation it is an ideal location for the study of linguistic diffusion. He explored the influence of the rather big town Larvik on the other towns of the peninsula. For this investigation, Trudgill divided the landscape under investigation into areas of uniform size and shape by applying a hexagon grid. This technique has been successfully employed by human geographers. The result is shown in Map 230.8.



Map 230.8: Brunlanes, Norway (from Chambers/ Trudgill 1980, 193).

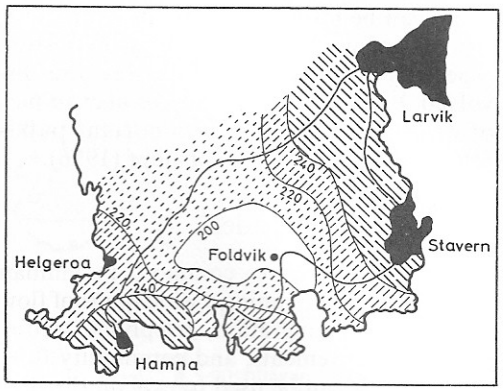
Subsequently, he selected at random one locality in each cell and recorded casual speech of a sample of speakers of three age groups in each locality. In examining the influence of Larvik on the other cities of the peninsula, he investigated among other things the realization of the linguistic variable /æ/, which has the following variants in Brunlanes:

(æ)–1 = [ɛ] score 000
(æ)–2 = [ɛt] score 100
(æ)–3 = [æ] score 200
(æ)–4 = [æT] score 300
(æ)–5 = [a] score 400

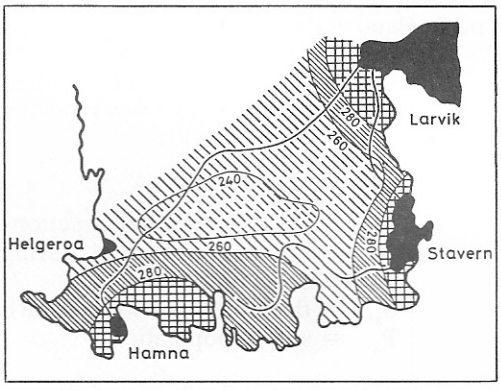
Variant (æ)–1 is the oldest pronunciation, (æ)–5 the most recent one. Index scores were calculated for each informant, ranging between a minimum of 0 – only use of (æ)– 1 and a miximum of 400 – only use of (æ)–5. The average scores for all cells of the map were worked out, for three different age groups: 24 years old and younger; between 25 and 69; older than 69. Subsequently, maps were drawn.

Maps 230.9, 230.10, and 230.11 were drawn for the three age groups, after the manner of geographers producing maps with height contours. These maps do not show isoglosses in the traditional sense but rather isoglosses relating to the average index scores. This method is, briefly, as follows. If two hexagonal grids with centre points a and b have, respectively, (æ) index scores of 150 and 75, and if, on our map, a and b are 15 millimeters apart, then a 'contour line' is drawn representing an index score of 100 that passes between a and b at a point 10 mm from a and 5 mm from b. If we take a look at Map 230.9 for the 70+ age group, we see three isoglosses indicating four different areas. In the central area around Foldvik the score is less than 200, around that area is a district with an average score higher than 200 but less than 220, then follows an area with a score higher than 220 and less than 240, finally there is the district around Larvik, Stavern and Hamna with a score higher than 240.

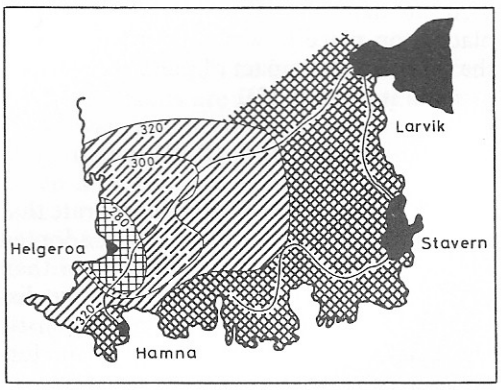
Map 230.9, 230.10, and 230.11 together provide a demonstration in apparent time of the linguistic change of the (æ) in Brunlanes. First of all, the scores are higher the younger the group of speakers is. Moreover, these maps show that the spatial diffusion of the newer variants is spreading outwards from Larvik, Stavern and Hamna. All three maps show further that the area around Helgeroa is most resistant to the innovation. The map of the (æ) pronunciation of the age group 24 and younger is striking because it shows that Hamna, while itself still receptive to innovation, has much less influence on its surroundings than in earlier periods, whereas the influence of Larvik and Stavern on its surroundings appears to be much greater. Trudgill presumes that the differences in spread of the new variant between the generations are due to the changes in the Brunlanes transport. At the times that the 70+ generation learned to speak roads had not



Map 230.9: Brunlanes (æ), speakers aged 70+ (from Trudgill 1974).



Map 230.10: Brunlanes (æ), speakers aged 25–69 (from Trudgill 1974).



Map 230.11: Brunlanes (æ), speakers aged 24– (from Trudgill 1974).

yet been constructed and therefore travel by sea between Larvik and the cities on the coast was far more important than over land travel, but at the time that the 24– generation learned their language road traffic was far more important than sea traffic. This explanation is plausible, but it is as vague as the ones of traditional dialect geographers. Therefore Trudgill has applied the gravity model to test the correctness of this explanation. In order to implement the factors that caused the distribution of this innovation among the 70+ generation, he used the model as in (2) to produce indices of the linguistic influence of Larvik on Stavern, Hamna and Helgeroa using distances by sea. In addition, scores for the influence of Larvik on Foldvik, lying in the centre of the peninsula, were calculated by land. Assuming that certain types of movement by land were relatively more difficult than by sea, d^3 was used instead of d^2 for calculating the influence over land. Since the dialects of Brunlanes are very similar to each other, no linguistic factor needed to be included. The indices of linguistic influence from Larvik on the other towns are shown in Table 230.1.

Tab. 230.1: Indices of linguistic influences from Larvik (first stage)

	sea model	land model
Stavern	10416	
Hamma	97	
Helgeroa	47	
Foldvik		18

Comparison of the figures in Table 230.1 with the pattern of Map 230.9 shows that the hierarchy of linguistic influence from Larvik predicted by the gravity model fits the data obtained for the older speakers. Where a high influence is predicted, high influence is attested, and where no influence is forecasted, none is found. This is a strong indication that the diffusion is due indeed to influence from Larvik by sea. In order to explain the map of the second generation (Map 230.9), Trudgill assumes that Larvik and Stavern together will influence the adoption of the innovation in Hamna, Helgeroa and Foldvik, and that the influence from other centres on those three towns have to be subtracted from the influence from Larvik and Stavern on them. Table 230.2 shows the results of calculating the linguistic influence.

Tab. 230.2: Indices of linguistic influence from Larvik and Stavern with subtraction of influence from other cities (second stage)

	sea model	land model
Hamma	107	
Helgeroa	42	
Foldvik		20

If we compare Table 230.2 with Map 230.10, we see that the adoption of the new feature was indeed greater in Hamna than in Helgeroa and Foldvik – as the model predicts –, but that – contrary to the model's predictions – it was greater in Foldvik than in Helgeroa. This exception can be explained by taking into account the switch in dominance from land to sea transport. Table 230.3 shows the indices of influence from Larvik and Stavern on Hamna, Helgeroa and Foldvik by land (with the subtraction of the influence from other cities on those three).

Tab. 230.3: Indices of linguistic influence from Larvik and Stavern with subtraction of influence from other cities (second stage)

	land model
Hamma	0
Helgeroa	14
Foldvik	20

The land model predicts a higher influence on Foldvik than on Helgeroa and that is exactly what we find on Map 230.10. In order to be able to explain the distribution of the innovation among the middle-aged speakers we have to reckon with contact by both sea and land. Map 230.11 of the younger generation can be explained in the same way as Map 230.10. It appears only that traffic by land has had more influence than traffic by sea.

The predictions made by the gravity model do not only correspond with the data in this Norwegian instance, but also for word initial h-deletion in east England (Trudgill 1974), the spread of the Chicago variants of the *(ae)* in Illinois (Callary 1975), and the spread of the Amsterdam variants of the standard Dutch *[Ei]* in the Netherlands (Gerritsen/Jansen 1980).

Gerritsen and Jansen (1980) propose a refinement of the linguistic part of Trudgill's model, the factor s. Although the predictions done by the gravity model about the spread of Amsterdam monophthongs for

standard Dutch *[Ei]* were almost entirely accurate, there were a number of exceptions of two different types. In the first place Amsterdam monophthongs came out where the standard gravity model did not predict them. The vowel systems in these places, however, could have developed monophthongization as a natural change, which can be reflected in a high structural similarity. Secondly, there were places where monophthong Amsterdam variants were expected, but where they were not found. In those cases the phonological system did already have a vowel like the Amsterdam monophthong. Adopting the Amsterdam variant would have led to a vowel merger and a loss of contrast. This can be rendered by a low structural similarity score.

6. Concluding remarks

Tobler (1970) stated as the first law of geography, that everything is related to everything else, but near things are more related than distant things. The same can be said for speakers, but that does not imply that social and spatial analysis coincide. Britain (2002) concludes that the analysis of spatial and social structure is far from being integrated (see also article 170). In this contribution, we focused more on the past than on the present. A good reason to do so is that existing patterns of variation ask for explanation on the basis of the past. The amount of data collected by dialectologists is enormous, and sociolinguists can make a crucial contribution in explaining the dialect-geographical diffusion patterns. There are several important aspects that deserve further attention:

- More experience need to be developed to apply diffusion models from human geography. The lack of experience means that new applications are too laborious. The consequence is that nowadays nobody any longer tests diffusion models.
- Existing diffusion models are too global and too much directed towards implementing simplified models; more analytically oriented models have to be developed, in which different factors can be incorporated.
- How can the study of ongoing processes of variation and diffusion be reconciled with an orientation towards the past? Britain (Article 170) concludes that sociolinguists fail to incorporate the notion of spatiality in their research.
- Despite the recognition of the impact of spatial factors, sociolinguists fail to implement space in their research designs in an integrative way. They focus on communities, networks and face-to-face interaction.
- Many sociolinguists prefer linguistic, structural explanations instead of external, social explanations.

The grand scheme of research in the study of language variation and change is to integrate the classical four dimensions of time, space, social structure and linguistic structure. From a linguistic point of view, one can observe that language contact is again a topic in which linguistic questions outweigh, as can be observed in Thomason (2001). In the field of language contact, a link is made between linguistic outcomes and kind of bilingualism. It is the task of sociolinguistics to keep the external factors, however complex they are, part of the explanatory framework, including the spatial dimensions of language and speech.

7. Literature (selected)

Abler, Ronald/Adams, John S./Gould, Peter (1977) *Spatial Organization. The Geographer's View of the World,* London.

Bailey, Charles-James (1973) *Variation and Linguistic Theory*, Arlington.

Bailey, Guy/Wikle, Tom/Tillery, Jan/Sand, Lori (1993) "Some patterns of linguistic diffusion.", in: *Language Variation and Change* 5, 359–390.

Britain, D. (2002), "Space and spatial diffusion", in: Chambers, J.K./Trudgill, Peter/Schilling-Estes, Natalie (eds.), *Handbook of Language Variation and Change,* Oxford, 603–637.

Callary, R. E. (1975) "Phonological change and the development of an urban dialect in Illinois", in: *Language in Society* 4, 155–169.

Chambers, J.K. (1995), *Sociolinguistic Theory*, Oxford.

– /Trudgill, Peter (1980) *Dialectology*, Cambridge.

Frings, Th. (1922 and 1926) *Sprache und Geschichte I und II*, Halle (Saale).

Gerritsen, Marinel/Jansen, Frank (1980) "The interplay between diachronic linguistics and dialectology: some refinements of Trudgills formula", in: *Papers from the 3rd International Conference on Historical Linguistics*, Maher, P.J., ed., Amsterdam, 11–38.

Goossens, Jan (1977) *Inleiding tot de Nederlandse Dialectologie*, Groningen.

– (1980) "De zuidelijke oorsprong van Nederlandse schrijftaalwoorden", in: *Liber Amicorum Weijnen*, Kruijsen, J. (ed.), Assen, 101–109.

Hägerstrand, T. (1965) "A Monte Carlo approach to diffusion", in: *Archives Européennes de Sociologie* 6, 43–67.

– (1967) *Innovation Diffusion as a Spatial Process*, Chicago/London.

Hard, Gerhard (1972) „Ein geographisches Simulationsmodell für die rheinische Sprachgeschichte", in: *Festschrift Matthias Zender, Studien zur Volkskultur, Sprache und Landesgeschichte*, Ennen, E./Wiegelmann, G., eds., Bonn, 2 Bde, 1 Bd., 5–29.

Hernandez-Campoy, Juan Manuel (1999) "Geolinguistic models of analysis of the spatial diffusion of sociolinguistic innovations", in: *Studia Anglica Posnaniensia* 34, 7–42.

Horvath, Barbara/Horvath, Ronald (1997) "The geolinguistics of a sound change in progress: /l/ vocalisation in Australia, in: *A Selection of Papers from NWAVE 25. Special Issue of the University of Pennsylvania Working Papers in Linguistics* 4, Boberg, Ch./Meyerhoff, M./Strassel, S., eds., 109–124.

Keller, Rudi (1994) *On Language Change. The Invisible Hand in Language, London*, New York.

Kloeke, G.G. (1927) *De hollandsche expansie in de zestiende en zeventiende eeuw en haar weerspiegeling in de hedendaagse Nederlandsche dialecten*, 's Gravenhage.

Kretzschmar, W./Schneider, E. (1996) *Introduction to Quantitative Analysis of Linguistic Survey Data. An Atlas by the Number*, London.

Labov, W. (1966) *The Social Stratification of English in New York City*, Washington.

Schützeichel, R. (1961) *Die Grundlagen des westlichen Mitteldeutschen. Studien zur historischen Sprachgeographie*, Tübingen.

Thomas, Alan R. (1975) "Dialect mapping", in: *Orbis* 24, 115–124.

Thomason, Sarah G. (2001) *Language Contact. An Introduction*, Edinburgh.

Tobler, W. (1970), "A computer movie", in: *Economic Geography* 46, 234–240.

Trudgill, Peter (1974) "Linguistic change and diffusion: description and explanation in sociolinguistic dialect geography", in: *Language in Society* 3, 315–246.

– (1983) *On Dialect: Social and Geographical Perspectives*, Oxford.

van Hout, Roeland/Scheepers, Willem (1981–1982) "Een paradox in het sociolinguistisch onderzoek: autochtonie vs. migratie, in: *Mededelingen van de Nijmeegse Centrale voor Dialect- en Naamkunde* XVIII, 33–75.

Weijnen, A. (1977) *The Value of the Map Configuration*, Special Issue of the "Mededelingen van de Nijmeegse centrale voor dialekt en naamkunde", Nijmegen.

Marinel Gerritsen/Roeland van Hout, Amsterdam/Nijmegen (The Netherlands)

231. Language Spread / Sprachverbreitung

1. From Europe to the globe

Languages have typically been spread to new territories as a result of military and commercial expansion. Religious missionary activity also necessarily entails language use. The 'spreading' of a language requires human agency, and is often orchestrated through an explicit policy for disseminating the language. The presence of European languages worldwide confirms a pattern of dominant powers exporting their languages, through colonisation (see art. 226) and the adoption of the dominant language by those who see it as in their interest to use it. This occurs often at the expense of the original languages. The vast majority of the languages in settler states in the Americas and Australia have been exterminated as a result of linguistic genocide, and the remaining ones are endangered. Language and cultural rights figure prominently in the demands of indigenous groups worldwide for greater autonomy (see art. 257). Cobarrubias (1983) has elaborated a taxonomy of policies that a state can adopt towards minority languages:

- attempting to kill a language;
- letting a language die;
- unsupported coexistence;
- partial support of specific language functions;
- adoption as an official language.

Each type has been widely practised both within states and in empires. There is sub-