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LAND USE IN THE BORDER, EASTERN CAPE PROVINCE

CHRISTOPHER BOARD

With 4 Plates and 2 Figures

Zusammenfassung: Landnutzung in „the Border", östliche Kap-Provinz der Südafrikanischen Union. Die in den Jahren 1955 bis 1958 durchgeführte Landnutzungsaufnahme war Teil einer umfassenden Regionalaufnahme der Border durch die Rhodes-Universität in der Südafrikanischen Union. Sie wurde durch eine Anzahl von Regierungsstellen unterstützt und finanziert.

Die Feldaufnahme, durchgeführt unter Zuhilfenahme von großmaßstäblichen Karten und Luftbildern, umfaßte 1547 Quadratmeilen in der Gegend der Hafenstadt East London an der Südostküste der Union. Eine zwölffarbige Landnutzungkarte nach dem Klassifikationssystem der Internationalen Geographischen Union wurde gezeichnet.

Die Border hat ihren Namen davon, daß sie einst eine Grenzzone zwischen den Siedlungsgebieten der Europäer und Bantustämmen war. Heute ist sie ein Mischsiedlungsgebiet mit einer großen Zahl verschiedener Arten der Landnutzung.

Um die landschaftliche Differenzierung zu zeigen, werden hier drei Gebiete mit nahezu gleicher naturräumlicher Ausstattung jedoch verschiedener Art der Landnutzung im einzelnen untersucht und dargestellt.

1. Das Ackerbau-Hochland der Eingeborenen:

Es ist das Siedlungsgebiet der Bantus, in welchem jedoch die traditionellen Landnutzungsmethoden infolge des herrschenden Bevölkerungsdruckes eine Änderung erfuhren. Eine Gemeinschaftsweidewirtschaft wurde von einer Teil-Selbstversorgungs-Landwirtschaft abgelöst, die auf Maisbau und dem Einkommen von zeitweise in der Industrie beschäftigten Bevölkerungsteilen basiert. Die offizielle Landnutzungsplanung zielt darauf hin, wenigstens einen Teil der Bevölkerung völlig auf gemischte (d. h. Ackerbau-Viehzucht) Landwirtschaft auszurichten.

2. Die Ananas-Zone:

Der Anbau einer einzigen Frucht für den Export gibt der Landnutzung dieses Gebietes ihre dominante Note. Große Kapitalinvestitionen und relativ geringe Produktivität machen diese teure Art des „Ackerbaues" sehr abhängig von Preisbewegungen auf dem Weltmarkt. Obwohl der größte Teil des Ackerlandes für die Erzeugung dieses einen Handelsgewächses auf den Farmen der Weißen dient, wird ein größerer Prozentsatz des Graslandes von den Rindern der Bantu-Landarbeiter beweidet.

3. Deutsche Siedlungen:

Verstreut liegende Flurstücke von Gemeinschaftsland und kleine Eigentümer wurden im Jahre 1858 an Militärsiedler und Bauern übereignet. Die darauf betriebene gemischte Landwirtschaft ist für den Lebensunterhalt gerade ausreichend, aber bietet darüber hinaus kaum zusätzliches Einkommen. Ungünstige Naturbedingungen, Mangel an Kapital und die Rechtsbedingungen des Landbesitzes verhindern die Konsolidierung zu größeren und lebensfähigeren Farmen.

The aim of this paper is to outline the methods, and to give some of the results, of a land use survey carried out between 1955 and 1958, in a very complex part of southern Africa, using the World's Land Use Survey's classification.

This survey formed part of a comprehensive regional survey undertaken by the Institute of Social and Economic Research, Rhodes University, Grahamstown, and was sponsored by the Natural Resources Development Council and the National Council for Social Research, who financed the project. The survey was the outcome of a request by the Buffalo Catchment Association, a regional development group based on East London and founded in 1946, to "promote conservation and development of the natural resources of the Buffalo Catchment Area". The expanding need for water by East London's growing population and industries, particularly after the war, was further emphasized by the need to ship water from Durban by sea in the drought of 1949. Two major water storage reservoirs, holding 6,450 million gallons, were completed in 1949 and 1951. Although these events had made clear the need for a hydrological survey, it was felt that a comprehensive one on the lines of the rural community survey in the Keisammahoek Native district, to the north-west of East London, should be made of the Buffalo Catchment Area. Rhodes University agreed to undertake the survey and subsequently decided for statistical convenience to extend the survey area to the two magisterial districts which include the Buffalo basin. It was

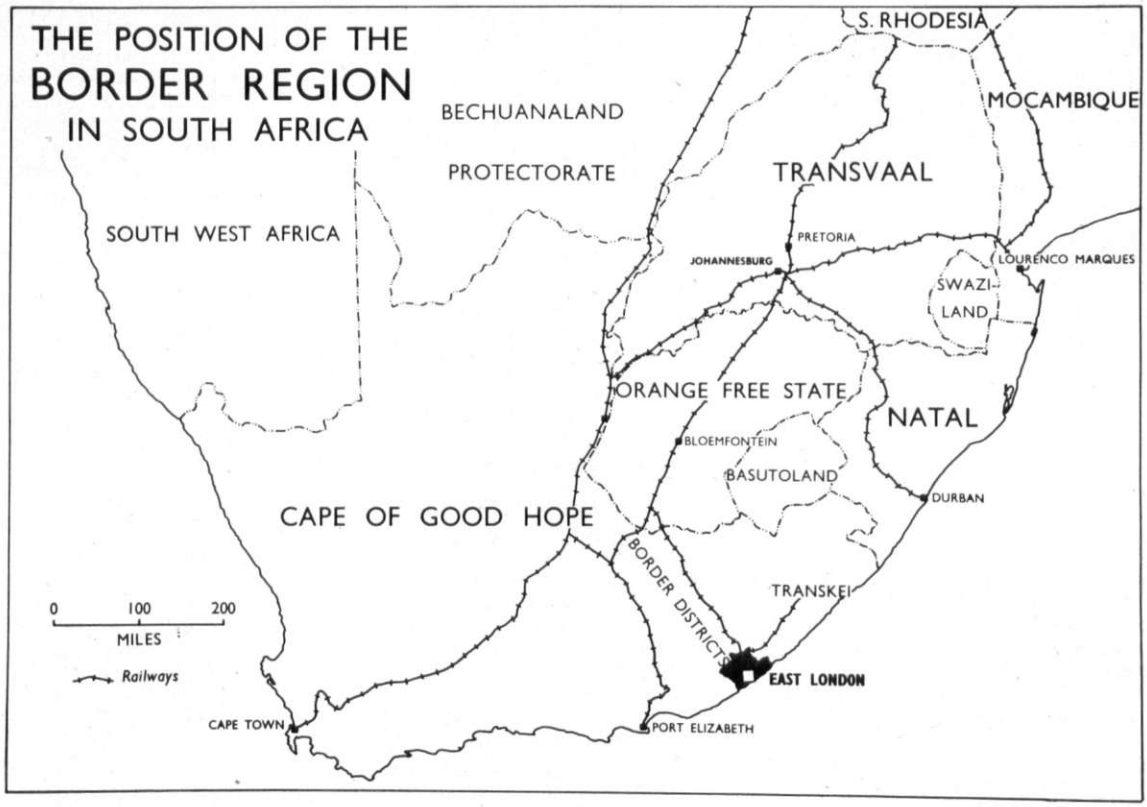

Fig. 1

decided to devote one section of the survey to natural resources and land use.

The survey area comprises the districts of East London and King William's Town, and area of 1,547 square miles, on the south-east coast of the Union of South Africa. It has 65 miles of coastline including the fourth major port of the country and lies astride the main routeways from the port to the Witwatersrand, Orange Free State Goldfields and Rhodesia. This area is called the Border because it was, in the 19th century, the frontier between the European settled and dominated Cape Colony, and the territory occupied by independent, primitive Bantu tribes. Today, the region is one of mixed settlement; with a chequerboard pattern of occupancy, deliberately created for the defence of the frontier districts of the Cape Colony*).

When the survey was begun in 1955 the Land Utilisation Survey of Britain was the obvious model. However, as the World Land Use Survey provided a ready-made classification suitable for world-wide conditions, it seemed sensible and interesting to employ that scheme. In any case, as only two years had been originally allotted for the survey, it was imperative to start field mapping at once. Although the classification proved adaptable to South African conditions, it was clear that the colour scheme and the degree of generalization of the pattern were to be conditioned by the nature of the region and its patterns, and the scale of the final map.

The scale of field mapping depended entirely on the available map or aerial-photograph cover, which included maps at 1:125,000, 1:50,000 and 1:18,000 and photographs at 1:20,000. Field mapping was done at the largest possible scale, mainly at about 1:20,000. It was possible to add information necessary for the compilation of the land use maps and final report to the photographs and maps in the field, either by direct observation or by enquiry from farmers. The information obtained in the area was then transferred to the most up-to-date topographical map. This was the Trigonometrical Survey's 1:18,000 Series, covering most of the area. The resulting land use pattern had then to be reduced to the scale of 1:125,000 for the compilation of the 12 coloured map at that scale.

*) The survey area is in fact only the southern part of the Border districts. It is the major portion of a territory annexed by Great Britain in 1847 and called British Kaffraria. Kaffraria Proper lay beyond it, east of the Great Kei river and is now known als the Transkeian Territories.

After the initial survey, further visits were made to selected representative farms, to provide more detail for the description of land use regions. Many of these farms were also included in an economic survey of a 5 per cent sample of farms in the Border area, which was undertaken in 1957. The economic statistics in this paper refer to averages based on that sample

The printed map is in twelve colours, which follow closely on those proposed by the commission of the International Geographical Union. The land use pattern is overprinted on a topocadastral base map, drawn for us by the Trigonometrical Survey of the Union, to which we are deeply indebted. Due to the techniques empoyed for printing and to the nature of the land use pattern, certain changes were made in the World Land Use Survey's suggested colour scheme.

Adaptation of World Land use Classification for Border Regional Survey

1a	Red	Built-up areas, mainly residential
1b		Built-up areas, mainly industrial and commercial
1c	Orange	Associated non-agricultural land, mainly recreational
1d		Associated non-agricultural land, mainly industrial and commercial
2	Deep purple	Horticulture including nurseries
3	Magenta	Perennial crops, including orchards, banana gardens
4a	Brown	Arable, with fallow, including pineapples and lucerne which are not truly perennial
5	Light Green	Improved permanent pastures, often irrigated
6a	Buff	Veld (unimproved pasture) used for grazing
6b	Yellow	Veld not used for grazing
7a	Dark Green	Dense forest and plantations
7b		of exotic trees of all ages Cut-over forest
8	Blue	Marshes not used for grazing
9	Grey	Unproductive land, sand-dunes and bare rock.

The main change has been from orange to buff for used unimproved pasture. Since roughly three-quarters of the area is in this category, a pale colour, incidentally suggestive of the winter colouring of the South African veld, was chosen. All other colours are overprinted on the buff. It was found possible to distinguish the small quantity of ungrazed, unimproved pasture by local inquiry. There being relatively little forest other than the "dense forest" of the World Land Use Survey, all forest was indicated in dark green. A vegetation map showing different types of forest, scrub and grass-veld in great detail, is being compiled by the Government Botanist, Grahamstown and will be included with the land-use map in a report to be published by the Oxford University Press.

Throughout mapping, emphasis was placed on the predominant use to which the land was put. Some of the more arid areas, which at first sight might well apear to be scrub, and to belong to category 7c of the international classification are, in fact, important grazing lands and are so marked on the map. Similarly, only marshes not used for grazing have been shown in blue.

Although the pattern which emerges is considerably generalized, the map does give an accurate impression of both the amounts and relative proportions of land put to different uses throughout the area. It has been possible to show patches of distinctive use as small as two acres in extent. As much of the country is highly dissected and many of the cultivated lands, orchards and patches of woodland are small, further reduction of scale would seriously detract from the value of the map. Variations throughout the survey area of firstly, the pattern of each type of use in turn, and secondly, the combinations of patterns of all types of use, can be detected with confidence. By using pilot surveys of this kind, it should be possible to compile a land use map for the whole of the Union of South Africa, with the help of aerial photographs. The scale of 1:500,000 is the largest for which there is uniform cover for all that territory. For the broader canvas of the World Land Use Survey, that scale is perhaps more suitable than the larger 1:125,000.

By virtue of its being a borderland, emphasized by the co-existence of African and European ways of life, the survey area has an extremely complex cultural landscape, to which the land use map is the key. One can more conveniently understand the differences which occur throughout the Border by examining the variations regionally, as local conditions play a large part in explaining the variations. The survey area has been divided into a number of land use regions each of which has a distinctive land use pattern, form of land utilization and often homogeneous type of farming. Three contrasting regions will be examined: the Tribal Arable Upland, the Pineapple Belt, and the German Settlements, which have some superficial similarities. An explanation of their differences will be attempted. One region is occupied by Bantu tribes, the other two by White settlers. All three regions have a relatively high proportion of unimproved grazing land. The physical differences between the regions are not very marked — two regions are in fact very alike. The major differences depend rather on racial grouping,

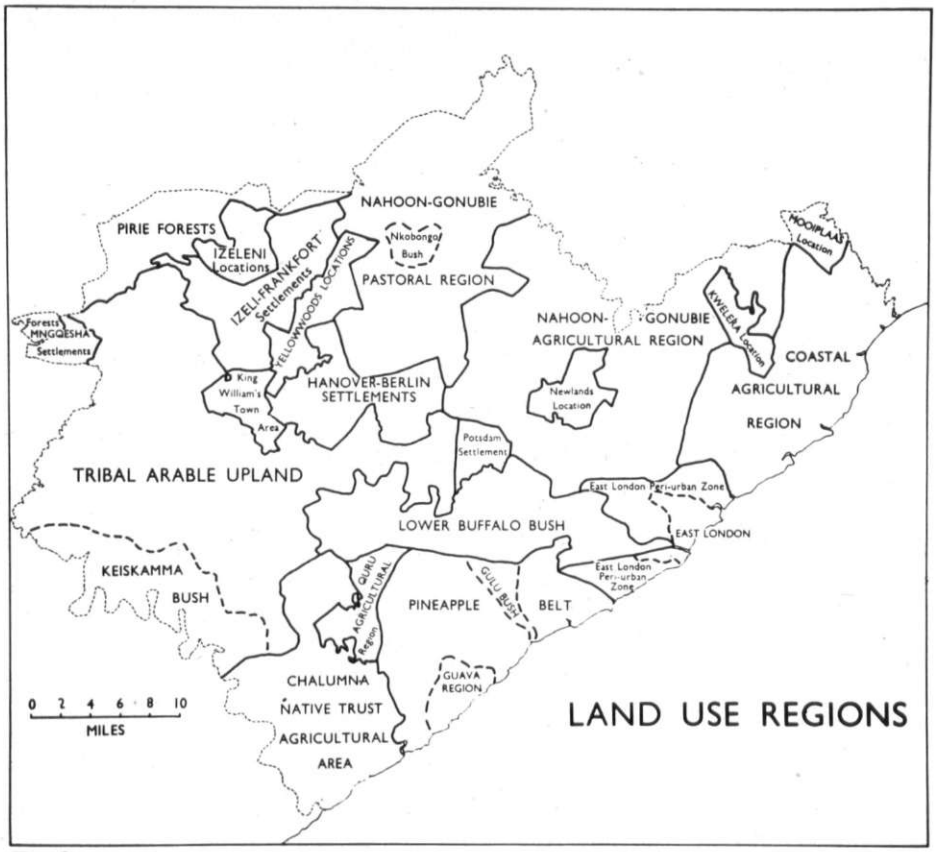

Fig. 2

settlement history and the accessibility of transport and markets.

I. The Tribal Arable Upland

This, the main tract of areas inhabited by Bantu tribes under their traditional framing system, occupies a broad stretch of undulating grassveld on the inner part of the coastal plain. It is crossed by the wooded valleys of several rivers and streams, which diversify the otherwise slight relief and provide the principal, if impermanent, source of water. The Bantu operate a subsistence economy which however no longer provides them with subsistence. As the Tomlinson Commission [1]) calculated, a properlybalanced farming system could support only one out of three families who now live in the area. The income from farming is augmented by the wages of members of the family temporarily away at work in the mines and in the towns. The farming system is communal, everyone having the right to utilize grazing land and woodland.

Arable land is located in the sheltered parts in large irregular blocks which are unsurveyed but divided by custom into allotments and separated by grass balks. Traditionally, a man is allowed to use as many allotments as he has wives. Cultivation of these allotments was women's work, but with the substitution of the plough for the hoe, and the increasing importance of the maize harvest, the men have become responsible for it. A man usually holds the usufruct rights over 1, 2 or 3 allotments each of 2 or 3 acres. In winter, the enclosed arable land is thrown open to livestock so that they can graze of the stubble and weeds. As a consequence, few winter feed crops are grown. One custom which has given rise to the so-called cattle complex is ukulobola, giving a marriage dowry of about 10 cattle to the bride's father. This has encouraged the accumulation of numbers of cattle regardless of quality, which has with increasing population in the Bantu Reserves, resulted in serious over-grazing and soil erosion.

Settlement in the tribal areas is so dispersed as to be impossible to include on the land use map.

[1]) Summary of the Report of the Commission for the Socio-Economic Development of the Bantu Areas within the Union of South Africa. UG 61/1955 p. 115. The figure quoted is for the Keiskamma Thornveld Area which includes the bulk of the survey area.

Plate 1: Traditional land use pattern in Native Reserves south of King Williams' Town.

One man's holdings are outlined. His umzi of 3 huts, old garden, cattle and goat kraals are within the pecked outline.

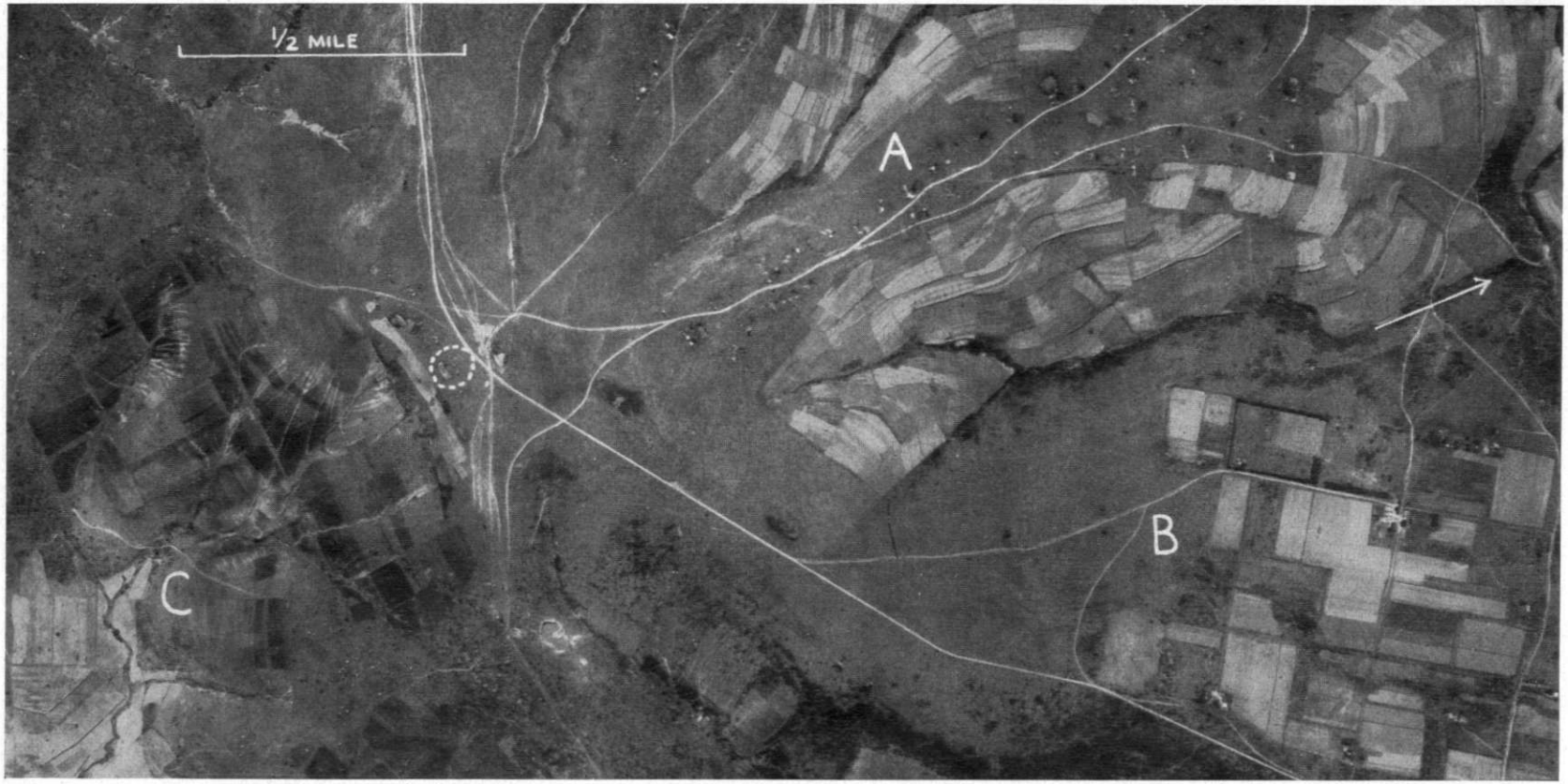

Plate 2: Three types of land utilization close together, north of King William's Town.

A Traditional Bantu pattern modified and improved by Betterment Scheme. B German settlement of 4 acre lots, farmhouses on the holdings. C Surveyed quitrent holdings, utilised in traditional manner by Bantu. Typical umzi within pecked outline. The attempt to make maximum use of oblong arable holdings on steep slopes has led to gully erosion even across strips ploughed roughly on the contour.

The settlement unit is the umzi or group of about 4 huts, with a garden for tobacco or more maize, and kraals for cattle and small stock.

The only orchards and plantations of exotic timber are those laid out by the Department of Native Affairs[2]). With little usable wood left in the heavily cut remnants of bush, timber and firewood are in desparately short supply. Dung is being used for fuel, instead of being spread regularly on the allotments which have long suffered from near mono-culture of maize.

The Native Affairs Department, in its work in planning land use in the tribal areas, is gradually altering the system of farming by culling cattle, fencing the veld for rotational grazing, introducing rotational cropping with légumes and the concentration of settlement into villages provided with water pumps and reservoirs.

II. The Pineapple Belt

This region lies just inland from the coast south-west of East London, on a frost-free coastal plain into which many streams and rivers are deeply cut. The Pineapple Belt may be distinguished from surrounding regions by the dominance there of a single cash crop — pineapples — which occupy much of the arable area. The individual farm is the unit here, all farms being owned or managed by Europeans. A significant proportion of estates is managed for companies or syndicates of business or professional men living in town. This is unusual in an area where most farms are owner-occupied and reflects the high capital investment in this type of farming. The farms of the Pineapple Belt were originally surveyed at about 1,500 acres each for experienced settlers from the Cape Colony. The land was of indifferent quality for livestock farming and the 19th Century experiments with cotton, coffee and sugar plantations were not a permanent success. Pineapples were grown successfully by a few farmers before the last war: but economic conditions after the war were favourable for a great expansion of production, as the pineapple industries of Asiatic countries were destroyed and those of America not able to compete for markets in the non-dollar countries. The canned fruit market in Britain and in Western Europe is the main destination for pineapples grown in the Union. With increasing competition from Malaya, Formosa and Australia, the producer's prices for fruit have halved in the last five years and the prices paid for land have also dropped to as little as a quarter of their level in the boom. Appreciation in property values had led to subdivision of the original farms; but not in the main, to a size below those considered uneconomic for pineapple production, which is about 600 acres. One farm in this belt was bought for £ 12,000 and part was later sold for £ 85,000 as a pineapple proposition.

The arable land, particularly when occupied by, or destined for, pineapples is commonly in large blocks, extending downwards from ridge-top into the valleys. Pineapple cultivation is concentrated on the better-drained, deeper, dark, dolerite soils, but has spread to the shallower light soils on sedimentary rocks where proper drainage must be achieved by planting on slopes. Elaborate methods of planting include the provision of contoured storm-water drainage furrows and cross channels, both of which act as access roads for the heavy lorries and machinery employed.

Although nearly 90 per cent of the farm income is derived from arable land, grazing land is not unimportant to the economy, as it is generally reserved for the cattle of the Bantu labour force. This is powerful incentive to otherwise landless Bantu, many of whose families also engage in casual labour-weeding and harvesting. On most farms they also have the use of a small patch of land for maize cultivation, but they do not have to rely on their own harvest for they receive regular rations of maize as well. Some bush has been cleared for pineapples but there is still woodland in the less accessible parts of the valleys.

Most pineapple farms are connected by all-weather roads to a network of tarred roads leading to East London, where 5 out of 6 of the local canneries are situated. (The other is in the centre of the Pineapple Belt 20 miles west of East London.) Since only from 20 to 40 per cent of the raw fruit is recovered in processing, it is an advantage for the canneries to be as near the producing area as possible.

III. German Settlements

These are areas, which all have the same characteristics of land utilisation, occur in physical circumstances very similar to those of the tribal areas and in many instances they lie next to the latter. The carrying capacity of the grazing is low by Western European standards (3 acres per beast) and permanent water supplies are scarce. Both of these disadvantages are partially overcome by communal grazing which enables the White peasant farmers of this region to subsist. Their forbears, as military settlers and agricultural immigrants from Germany in the 1850's, were given between 5 and 30 acres of freehold land. As

[2]) Department of Native Affairs now called Department of Bantu Administration and Development.
The Maps in Figures 1 and 2 are based on official maps prepared by the Trigonometrical Survey. These and the aerial photographs are reproduced by permission of the Government Printer, Pretoria.

Plate 3: Two pineapple estates west of East London.

Characteristic patterns of pineapple lands: — sugar-cane wind-breaks, contour drains and access roads. Note that most of the pineapple cultivation is on the belt of darker soils. The aspect of the country before the introduction of pineapples is seen on the west. A-Maize lands for labourers. B-Compound, stock kraals and grazing area used by labourers.

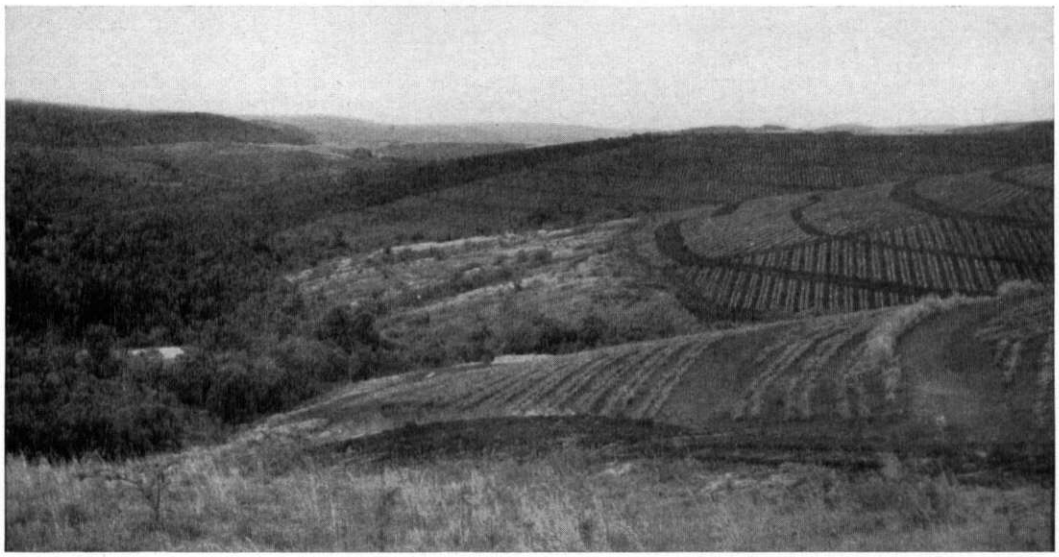

Plate 4: Close-up of newly planted pineapple lands.

Double rows help to support heavy, mature fruit. Diagonal planting to increase drainage. The sugar-cane windbreaks also binds lower side of contour roadway.

the number of livestock which the peasants are permitted to run on the commonage is limited to 40 head of cattle (or the equivalent), they cannot attain the same standard of living as other White farmers with larger individual properties. By operating a mixed farming system, with the emphasis on livestock and dairy produce (mainly cream), they can manage to sell nearly three-quarters by value of their farm produce and at the same time supply the needs of their labour and themselves, largely off the farm. As they cannot afford to offer grazing rights to Bantu farm labourers, they often allow Bantu families to live rent-free on the farm in exchange for occasional help with farm work and in the homestead.

The improved land, which amounts to roughly a quarter of the total, is frequently laid out in large sub-rectangular blocks, each of which is divided into the individual holdings of the peasant farmers. Having been surveyed, the arable lots are not of uniform quality, nor are they in the most suitable positions. As in the tribal areas, the holdings of one man may be scattered but they are all usually enclosed. The peasants often attempt to practise a simple rotation of crops and manuring is done assiduously. The main crop is commonly maize, but beans, peas and potatoes are quite important. Winter cereals are sometimes grown for fodder. Homesteads, small orchards and occasionally some horticulture are found together in the individual plots but not to the same extent in the villages. The latter, laid out by the surveyors as part of the original scheme of close settlement which was to strengthen the defences of the frontier and to pacify the "natives" by close contact with civilisation, were never successful as nucleated settlements. They remain today as minor service centres with Lutheran Church, a couple of stores and perhaps a hotel, police station and post-office. There is a little woodland remaining in the valleys, more than in the tribal areas; and those villages near the mountains have had free access to forests. Both sources of timber have been heavily exploited.

All the communal grazing was on free range until soil conservation measures introduced fenced camps and rotational grazing in one of the settlements. Another impending improvement involves the subdivision of commonages, allotting a proportion of the grazing to each lot holder. The conversion of the peasant holdings into fully individual farm units and the abolition of grazing stints, make the consolidation of the same holdings a more attractive proposition to investors than at present. Making farming more intensive by the introduction of irrigation is not a possible method of improving the holdings, as the peasant farmers have not sufficient capital nor can they easily borrow for such schemes. An ageing peasant population, can subsist on their holdings but not elsewhere on the same amount of capital. Many of the younger generation have left for the towns, but they continue to support their relatives who remain on the land. Close settlement of White farmers on dryland farms cannot be considered an economic success in the Eastern Cape Province.

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KLIMATOLOGIE DER ATMOSPHÄRISCHEN STÖRUNGEN ÜBER EUROPA

Walter Dammann

Mit 14 Abbildungen und 4 Tabellen

Summary: Climatology of atmospheric disturbances. This investigation using early as well as recent papers and publications as a starting point is based on the distribution of low pressure areas during the decade 1948—1959. Their distribution pattern was derived by counting them in 5° graticule fields as well as in relation to land and water surfaces and mountains. The pattern shows a surprisingly close connexion with the outlines of the European continent since, on the whole, the sea areas have larger and the land areas smaller frequency values. This result can be readily understood in terms of physical causation, viz differences in surface friction and temperature regime of land and water surfaces. The smaller surface friction over the sea compared with the land is relatively cyclogenic; this tendency is reinforced especially in winter by the thermal contrast between the air bodies on either side of the coastline. The reason why their effect comes out so clearly in the distribution pattern of the low pressure areas seems to be that pressure reacts most sensitively to those influences, at least when they combine. Thus the distribution pattern of the high altitude depressions in the 500 mb surface is very similar to that at ground level, an indication that these are genuine atmospheric "disturbances".

During the summer shallow thermal lows dominate the ground level pressure fields, especially above the land and during the day. Since they are formed within one and the same air mass they are rarely connected with frontal systems. They give, nevertheless, rise to a summerly monsoonal component of air exchange and a diurnal land-sea breeze, circulations whose intensity within the air pressure field increases with decreasing latitude (i. e. increasing temperature).

The annual pattern of the frequency of deep ("genuine") cyclones and the shallow low pressure formations in the North Sea and Baltic Sea regions, the middle European land mass and the Mediterranean regions, provide a basis for an understanding of the sequence of weather conditions from a synoptic-climatological starting point. The annual pattern of occurrence of high altitude depressions as compared with that at ground level shows no principal difference, except that their number is smaller at the 500 mb level. This lessening in intensity at a higher altitude is to be expected but the main reason for it is that the high temperature "lows", and in winter the thermal "highs", as formations of the air near the ground, do not reach up to this higher level. This also emerges from two specific examples of the major circulation of the atmosphere (summer heat-wave, winter frost spell).

The result of this investigation shows that the sequence of weather conditions in Europe must not be seen merely as a consequence of atmospheric events of a higher order steered from afar (Atlantic Polar front). This sequence rather mirrors also local geographical influences, and does so to a degree which may not have been generally appreciated. These factors are not merely passive, there are thoroughly active ones as well. In particular the area near the coast makes itself felt with a kind of "pseudo-permanent frontal zone" *en miniature* which results from the differential friction and the contrast between maritime and continental air bodies, mentioned above, as a relative effect of the land-sea distribution. Mountain regions, on the other hand, have cyclone-repelling effects. The close link of the weather sequence with the earth's surface shown and discussed in this paper through the distribution of low pressure areas provides a basis for making the "seemingly haphazard and moody course of the weather" (van Bebber, 1881) in its causes and appearance open to a truly geographical aspect more than has so far been possible.

I. Einführung

Die Formulierung „Klimatologie der atmosphärischen Störungen" gebrauchte 1881 J. van Bebber, Meteorologe an der ehemaligen Deutschen Seewarte, in einem Aufsatz über „Die geographische Verteilung und Bewegung, das Entstehen und Verschwinden der barometrischen Minima in den Jahren 1876—1880[1])". In diesem Aufsatz finden sich einige sehr bemerkenswerte, vielleicht würde man heute sagen: „moderne" Sätze, die der Vergessenheit entrissen zu werden verdienen:

„Zwei Methoden gibt es, um die den atmosphärischen Erscheinungen zu Grunde liegenden Gesetze zu erforschen. Die ältere, welche bis vor einigen Jahrzehnten fast ausschließlich zur Anwendung kam und die ‚statistische' genannt werden kann, beruht auf der Bestimmung und Vergleichung der Mittelwerte der einzelnen meteorologischen Elemente. Aus den vieljährigen Mitteln ergibt sich der klimatische Charakter

[1]) J. van Bebber: „Die geographische Verteilung und Bewegung, das Entstehen und Verschwinden der barometrischen Minima in den Jahren 1876 bis 1880." Zeitschrift der Österr. Ges. f. Meteorologie, Bd. XVI (1881) S. 414—419.