RESPIRATORY ALLERGY IN THE COASTAL AREAS OF SOUTH AFRICA

THE SIGNIFICANCE OF CLIMATE

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Symptoms may be precipitated and maintained in a person with an allergic tendency by exogenous factors such as inhalants, ingestants and physical influences as well as by endogenous factors including bacterial and parasitic infections and endocrine and psychological disturbances. These possible trigger factors operate singly or in combination and their identification is desirable in the simplification of the therapeutic approach to the allergic patient.

In respiratory allergy of the seasonal type the inhalation of the prevailing pollens is the factor responsible. In the perennial or non-seasonal variety pollens do not play a part and other agents must be sought.

Seasonal respiratory allergy in South Africa has been described [1] in detail but certain aspects with a present bearing will be referred to here. Grass pollinosis is the only seasonal respiratory allergy of importance and occurs in summer from October to March with a maximum incidence in December and January. The limitation of symptoms to this period characterizes the condition and renders etiological diagnosis simple.

Seasonal pollinosis in South Africa occurs mainly but not exclusively in the natural grasslands of the country (Fig. 1). These grasslands are largely confined to the Northern Karroo or Highveld (C in Fig. 1)—the central plateau which covers most of the Transvaal, particularly in its southern part, the Orange Free State, and the western portion of the Eastern Cape Province. This plateau, 4,000-6,000 feet above sea-level is situated in the region of spring and summer rainfall with long cold dry winters.

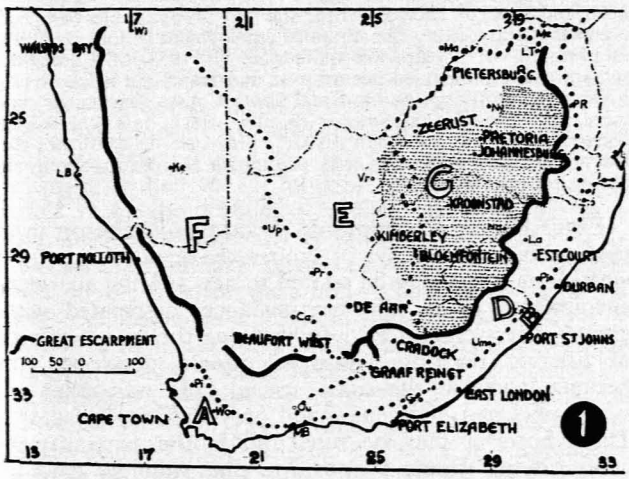

Fig. 1. Map of the Union of South Africa showing the principal inland and coastal towns as well as the Great Escarpment. The dotted lines divide the country into the following regions: A—South-West Cape, B—coastlands of South-East Cape and Natal, C—Eastern Plateau, D—Eastern Plateau slopes, E—Semi-arid Interior, F—deserts. The Natural Grasslands are indicated in the stippled area.

The greater portion of the Union of South Africa has an elevation of some 3,000 feet above sea-level, the area below 1,500 feet consisting of a narrow fringe around the coast. The vegetation of the coastal region extending east and north-east and including Port Elizabeth, East London and Durban (B in Fig. 1) is of the temperate savanna and sub-tropical forest types with comparatively little grass. In the South-West Cape (A in Fig. 1), in which Cape Town is the principal city and which has a winter rainfall, the vegetation is of the sclerophyl type. Much of the territory on the west of South Africa consists of semi-desert vegetation with hardly any grass. In the adjoining temperate savanna areas there is open bush with an undergrowth of grass.

Perennial respiratory allergy, which includes allergic vasomotor rhinitis and sinusitis (nasal and paranasal allergy) as well as bronchial asthma, is of common occurrence in South Africa and often presents a difficult etiological and therapeutic problem.

Bronchial asthma could hardly be overlooked by any physician but the allergic conditions of the upper respiratory tract are often incorrectly regarded as of infective origin and dealt with by chemotherapeutic, antibiotic and operative measures. To an even greater extent the minor respiratory allergies, including recurrent and continuous 'colds' and constantly blocked or running nose, are frequently considered of trifling significance. The neglect of these conditions is to be deplored, for they may be the precursors of more serious allergic states and demand adequate treatment and control. The confident prophecy of the physician that 'the child will grow out of it' sometimes comes true but not infrequently is unwarranted optimism.

Perennial respiratory allergy is both clinically and etiologically no different in South Africa from elsewhere, and the recognized exogenous and endogenous causative factors are frequently found; but there remains a considerable proportion of cases where careful clinical and laboratory investigations fail to reveal specific factors. It is especially amongst such cases that the etiological significance of climate has been studied.

Attention was drawn in 1951 [2, 3] to the fact that the incidence of perennial respiratory allergy is comparatively high at the coast, especially the East Coast, where the condition of sufferers from inland areas tends to become worse. Extensive experience of patients in different parts of the country since that time has amply confirmed this view. Large numbers of patients have been investigated in this connection in Johannesburg and at the larger coastal towns of the Union. The

geographical relationship of these towns to one another and to the Great Escarpment, where land surfaces rise to higher levels from the coast, is shown in Fig. 1. It is our opinion that climate *per se* is a significant exciting or trigger factor in the disturbance of the equilibrium which an allergic subject may be enjoying.

The cases described below, typical of many patients seen in Johannesburg, represent people reasonably well-balanced allergically in the Highveld of the Transvaal and Orange Free State but in whom symptoms of bronchial asthma or allergic rhinitis developed or were significantly aggravated when they lived at or visited the coast.

PATIENTS SEEN IN JOHANNESBURG

Case 1. Mr. W., clerk, aged 28 years. East Rand. Suffered from bronchial asthma in Port Elizabeth where he lived until 18 years of age. He had only 2 attacks of asthma in his army service, which included Central Africa, Italy and Burma. On his return he visited Port Elizabeth for 2 weeks and suffered from asthma all that time. In Johannesburg, where he then lived for more than 7 years, he was free from symptoms. He developed asthma only on visiting the coast and for a few days after his return home.

Case 2. Mrs. H., aged 27 years. Johannesburg. Suffered from recurrent 'colds' in East London up to the age of 7 years, when asthma commenced. Came to Johannesburg when 10 years old and had considerable vasomotor rhinitis but very little bronchospasm. She is fairly well at Cape Town but, on a recent visit to Durban developed asthma severe enough to warrant hospital treatment there for a month.

Case 3. Miss W., nurse, aged 21 years. Johannesburg. Born in Germiston and lived in Durban from 1940 to 1950, where bronchial asthma commenced 4 years after arrival. In Johannesburg the asthma gradually subsided and she then suffered mainly from 'hay fever'. On a subsequent visit to Durban she developed severe asthma a day after arrival and was compelled to return to Johannesburg. She had attacks of asthma in Durban on 2 subsequent visits, one in summer and one in autumn.

Case 4. Miss S., clerk, aged 37 years. Lives in Johannesburg where she was born. Vasomotor rhinitis commenced at the age of 15 years while on holiday in East London and has continued since then in Johannesburg but in milder form. Each March in subsequent years she has visited Durban or a South Coast resort and on each occasion developed asthma. During a vacation at Cape Town on account of severe asthma she was compelled to return to Johannesburg, where her chest cleared within a week. She enjoyed good health on vacations in the Drakensberg and in Rhodesia but has had 2 attacks of asthma subsequently in Johannesburg.

Case 5. Mr. F., student, aged 18 years. Johannesburg. Suffered from bronchial asthma for 18 years while living in Port Elizabeth. He had no symptoms in Bloemfontein, where he lived from 1945 to 1948. There was some recurrence of symptoms in Johannesburg but in milder form. He is always worse at the coast, particularly Beira, Durban and Port Elizabeth.

Case 6. Mrs. S., aged 22 years. Johannesburg. Suffered from vasomotor rhinitis during most of her school days. Her condition improved as she grew older and she was quite free of symptoms for a year before her marriage. She visited Durban on honeymoon and asthma commenced 2 days after arrival there and continued throughout a coastal voyage from Durban to Cape Town. On the return journey she became free of symptoms in the Karroo and remained well in Johannesburg. She later visited Margate, Natal South Coast, and suffered from asthma, which however disappeared in Johannesburg. On a subsequent visit to Port Elizabeth asthma recurred for more than 2 weeks but again she had no further symptoms in Johannesburg.

Case 7. Miss N., clerk, aged 18 years. Benoni. Suffered from 'colds' since childhood. For the last 3 years has had attacks of vasomotor rhinitis and asthma lasting a day or two, which occur every few weeks but not related to menstruation. She was notably worse at the Natal South Coast towns of Doonside and Margate, where she had to seek medical advice on each occasion. In February 1954 severe asthma commenced a fortnight after arrival on vacation in Scottburgh, also on the South Coast, and continued for the remaining week of her holiday there.

Case 8. Mrs. L., aged 28 years. Johannesburg. Vasomotor rhinitis in Johannesburg from the age of 9 years. Lived in Durban for 7 years from the age of 20 and suffered from bronchial asthma throughout that period. On her return to Johannesburg a year ago she was very much improved, with only occasional mild bronchospasm and some 'hay fever'. She developed severe asthma while on a 3-weeks vacation visit to Durban recently.

Case 9. v. W., European girl, aged $6\frac{1}{2}$ years. Germiston. The details are graphically illustrated in Fig. 2. She was born in East London and from a few months old suffered from constant 'colds' until 10 months old, when the family moved inland. For more than 2 years at Maritzburg and Johannesburg she was completely free of symptoms. She again moved to East London and remained well for 10 months, when she commenced to suffer from asthma, which rapidly increased in severity and then continued, in a somewhat milder form at first, on moving inland again to Germiston. It is interesting to speculate whether asthma would have occurred at all had the patient not returned to East London.

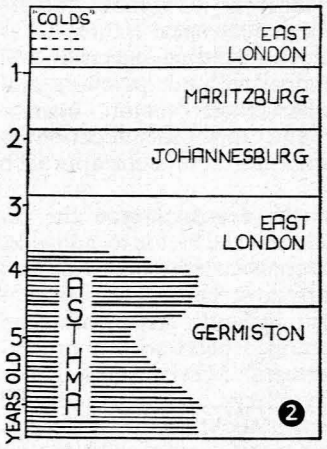

Fig. 2. *Case* 9. Child v.W. (see text). The chart demonstrates the commencement of symptoms of respiratory allergy in infancy at the coast, their absence in inland areas and their recurrence in severe form on return to the coast. Amelioration of symptoms no longer occurs inland.

Case 10. Mrs. S., Johannesburg. The details are illustrated graphically in Fig. 3, and show how a visit to Margate, Natal, apparently precipitated asthma in a woman who had not previously suffered from respiratory allergy. It will be observed that there was an exacerbation of symptoms each time she paid a vacation visit to the Natal South Coast and that the patient has not so far regained her original good health.

Case 11. V., a married native woman aged 26 years, was born and lived in Zeerust, where she was always quite well, not even subject to 'colds'. She obtained employment in Johannesburg in 1948 and for 5 years was quite well. In 1953, as a domestic servant she accompanied her mistress and family for a few weeks holiday in Scottburgh on the Natal South Coast. During her stay there she developed vasomotor rhinitis, which has persisted in Johannesburg for more than a year. This case demonstrates the fact that coastal conditions may precipitate respiratory allergy in non-Europeans also.

Exacerbation of symptoms in an allergic person in a new environment may, of course, have nothing to do with climate but may be related to new specific allergens encountered or to new circumstances associated with greater stress conditions. In studying the case histories of allergic persons whose symptoms developed or became worse at the coast special note was taken of such possible allergenic and psychological factors. These however may be ruled out in the generality of cases on the simple proposition that sufferers tend to become worse at the coast whereas the inland movement of such patients from the coast is nearly always followed by improvement in allergic health.

Alleviation of a patient's symptoms in another area may be due to the absence of pollens or fungi to which he is sensitive. As already indicated specific pollen

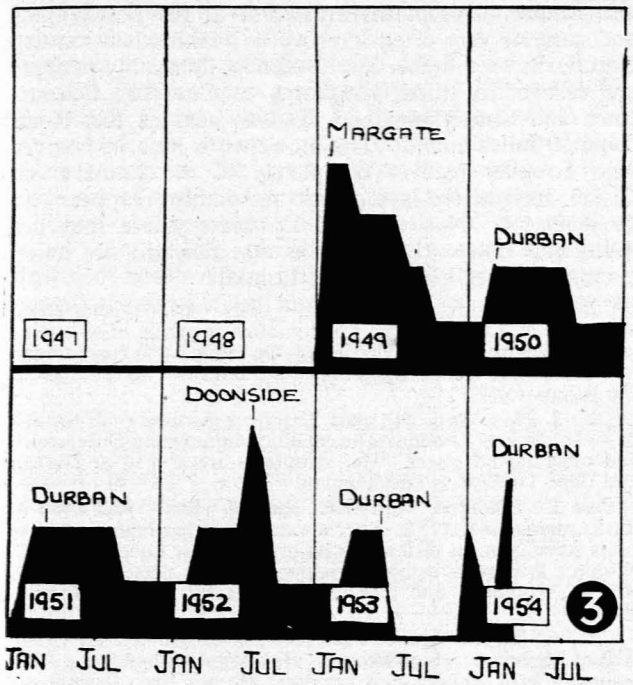

Fig. 3. *Case* 10. Mrs. S. (see text). The chart demonstrates the initiation and exacerbation of symptoms of respiratory allergy in the coastal towns indicated.

factors can be significant only where symptoms are limited to the seasons in which the plants flower. Seasonal hay fever due to grass pollens does not infrequently occur at the coast, but is readily differentiated by its characteristic summer incidence. In Durban and northward where the pollens of the lush subtropical vegetation are frequently suspect, pollen sensitization cannot be important, because the heavy pollens of tropical plants are insect-borne and in any event would produce pollinosis only in the season of their flowering. In Port Elizabeth, Cape Town and certain parts of Natal, where acacia trees are abundant, there is a widely-expressed opinion that the exacerbation of symptoms in spring is due to the pollens of these trees, which flower from about August to October. Specific skin tests, however, have not confirmed this view. It is possible that the dry powdered flowers when blown about by the wind produce non-specific irritation of the nasal and bronchial mucosa. Similar exacerbation of symptoms in the autumn so frequently complained of cannot of course be accounted for by sensitivity to acacia pollen. As respiratory allergy at the coast is of the perennial type and because skin tests with local pollens do not confirm this possibility a pollen etiology must be discounted.

The warmth and humidity of the subtropical areas on the eastern shores of Southern Africa suggest that atmospheric fungi might play a part in local respiratory allergy. Householders there often complain of moulds on clothing, leather goods and foodstuffs in the home. Numerous cases selected for us by physicians and otorhinolaryngologists as typical of local perennial bronchial asthma and allergic rhinitis were submitted to fungus skin-sensitivity tests in Durban, Port Elizabeth and Cape Town with a wide range of fungus allergens. Sensitivity was demonstrated only in a small proportion of cases and in no greater numbers than in some of the inland cities of the Union where similar studies have been made. Exposure of plates of culture media to the atmosphere in these coastal towns did not reveal the presence of fungus elements different from those found in Johannesburg, where atmospheric fungus studies have been carried out for many years. The fungus content of house dust and bedding materials from the homes of sufferers at the coast was not found to be significantly different from corresponding material in Johannesburg. A fungus factor therefore in coastal respiratory allergy has so far not been substantiated.

It has been suggested that in damp atmospheres house dust is rendered more allergenic by the action of micro-organisms [4] or that it is quantitatively increased by the breaking-down action of fungi on animal or plant fibres. [5] These views still await scientific confirmation. Investigation to this end is being pursued in our laboratories but large numbers of allergic patients both from inland and coastal areas have shown similar skin reactions to extracts of house dust derived from either region. An enhanced *clinical* sensitivity to coastal house dust is a possibility and this aspect is being studied.

PATIENTS SEEN IN THE COASTAL TOWNS OF SOUTH AFRICA

Perennial respiratory allergy was also studied in towns on the South Coast and East Coast of South Africa from Cape Town to Lourenco Marques and including Port Elizabeth, East London and Durban. Lourenco Marques is just outside the borders of the Union and will therefore not be especially considered here but, with its high incidence of vasomotor rhinitis and bronchial asthma presents the same picture as in the coastal areas further south.

Numerous patients were investigated at each of these coastal towns and the cases described hereunder are examples of those in whom significant amelioration of symptoms occurred when they moved inland.

Cape Town

Respiratory allergy of the perennial type is commonly seen in Cape Town and occurs in Europeans and Eurafricans (Coloured) but to a lesser extent in Natives. The incidence of bronchial asthma is greatest in the spring (September and October) and in autumn (April). The climate is relatively humid in March and April and fogs occur in the low-lying parts of the city especially in the Cape Flats. Respiratory allergy is invariably worse in damp or windy weather, and its incidence is thought by some to be relatively high in the Cape Flats, Pinelands and Milnerton areas. Bronchial asthma and nasal allergy commonly affects Natives and Coloured people who visit Cape Town from their homes in the country.

Case 1. Miss G., nurse, aged 34 years. Was born in Namaqualand where she spent most of her life and was quite well. Asthma

commenced in Cape Town after a few years residence there. She is quite well during vacations at home.

Case 2. Mrs. S., aged 43 years. Quite well before she came to live in the Cape Flats, where she has suffered from asthma for 15 years. She has no symptoms on her visits to the Karroo.

Case 3. Mr. R., train conductor, aged 29 years. Asthma for 21 years in George. Much improved when he lived in the Transvaal for 7 years. Vasomotor rhinitis and bronchial asthma commenced within 14 days of his arrival in Cape Town and have persisted.

Case 4. Mrs. G., Native housewife, aged 36 years. At her home in Burghersdorp was always quite well. Arrived in Cape Town in 1941 and after a year began to suffer from bronchial asthma, which is becoming worse.

Case 5. Mrs. N., Native nurse, aged 27 years. Quite well at her home in Queenstown. Vasomotor rhinitis commenced shortly after her arrival in Cape Town. The condition cleared up during vacation in Grahamstown but recurred almost at once on her return to Cape Town.

Case 6. Native nurse, aged 34 years. Her home is in Cala in the Transkei, where she is always quite well. Bronchial asthma commenced when she arrived in Cape Town in 1949 and has persisted.

Port Elizabeth

Perennial respiratory allergy is very common in Port Elizabeth. The incidence is highest in the spring (August to October) and in autumn (March to May), when the weather is wet and windy. The areas near the sea front have a worse reputation than those on a somewhat higher level. The exacerbation of the condition in spring is ascribed by many to the pollen of the acacia trees, which flower at that time. Europeans and Coloured people suffer with equal frequency and severity but Natives appear to be less affected. Doctors agree that nearly all sufferers improve in health when they move inland, mainly to Graaff Reinet, Cradock, Cookhouse and the Swartberg and Suurberg regions.

Case 1. Miss W., aged 16 years. Well to the age of 4 years and thereafter suffered from recurrent 'colds'. Asthma for the last 3 years in Uitenhage near Port Elizabeth. She is always quite well in Cradock, Graaff Reinet and Kommadagga.

Case 2. Miss G., Coloured, aged 28 years. Bronchial asthma for the last 9 years. Commenced a few years after her arrival in Port Elizabeth from Graaff Reinet, where she was always quite well.

Case 3. Miss E., Coloured, clerk. Suffered from vasomotor rhinitis for 4 years in Port Elizabeth. The condition cleared completely while on a visit to Graaff Reinet but recurred on her return to Port Elizabeth.

Case 4. Mr. E., aged 49 years. Vasomotor rhinitis commenced some 17 years ago, on arrival in Port Elizabeth from Johannesburg, where he had been free from respiratory complaints. On a visit to Johannesburg in July 1952 the condition cleared up completely but recurred on his return to Port Elizabeth.

Case 5. Master H., 6 years. Born in Port Elizabeth. He was perfectly well until whooping cough occurred at the age of 2½ years. For six months thereafter he suffered from head and chest 'colds' followed by bronchial asthma. He has a watery nasal discharge every morning and a constant post-nasal drip except on very fine days. He is worse in the afternoons and evenings 'when the wind comes up'. In each of a number of 3-4 week periods spent in Oudtshoorn he was quite well. He was somewhat wheezy' in Cape Town on 3 weeks holiday there.

East London

Perennial respiratory allergy is very common in East London and is said to be aggravated when the East winds blow from the sea. By others, however, the exacerbation of symptoms is ascribed to the pollen of the acacia trees which flower from August to October. Similar exacerbations however also occur in February and March. Symptoms are worse at the beach areas and patients very often improve in health when moving to suburbs on a higher level. Almost invariably patients are relieved of their symptoms in Cradock, Queenstown and Stutterheim and even as near as Kei Road some 20 miles inland. The incidence is high in Natives who however recover completely in the Transkei or Ciskei but whose symptoms inevitably reappear on their return. Natives from Lovedale where they are quite well frequently complain that they do not enjoy a symptom-free night in East London.

Case 1. P., European boy, aged 7 years. Asthma commenced at the age of 2 years in East London after an attack of whooping cough. He is quite well at Tarkastad. On returning to East London he remains free from symptoms for a month or two only before the asthma recurs.

Case 2. Mrs. v. d. M., aged 22 years. Asthma since the age of 7 years in East London. The condition improves at Queenstown and other inland places. Her symptoms are as bad in Durban and Cape Town as in East London.

Case 3. Coloured, ward-maid, aged 60 years. Had lived in East London since 1937. After a vacation at her home in Mooiplaas some 20 miles distant she returned to East London in 1942. Within a few weeks asthma developed and has persisted. She is well at Mooiplaas and also at Fort Beaufort, about 19 miles inland.

Case 4. E., Native male, aged 53 years. Has always been quite well at his home in Sterkstroom. He commenced suffering from asthma after 4 years in East London. He was free of symptoms during a visit of a month to Sterkstroom during 1953 but the condition recurred almost immediately on his return.

Durban

Perennial respiratory allergy is very common in Durban in Europeans, Africans and Indians. The climate is subtropical in character, especially in the summer, and characterized by high temperature and high relative-humidity.

Case 1. Mr. B., aged 34 years. Allergic rhinitis commenced in Durban in 1941 and bronchial asthma in 1945. He is quite well during visits to Johannesburg and Kimberley.

Case 2. Mr. M., aged 43 years. Asthma since 1940 in Durban. Quite free of symptoms in the Transvaal and in Barkly East.

Case 3. Mr. K., storeman, aged 19 years. Bronchial asthma commenced 3 weeks after his arrival in Durban from Vryheid, where he has always been quite well.

Case 4. Mrs. J., aged 23 years. Hay fever since childhood in Johannesburg, where the incidence was seasonal and hardly troublesome. The condition is worse in Durban, where asthma occurs, mainly at night.

Case 5. P., Indian male, aged 15 years. Constant 'colds' for the last year. Was quite well for 6 weeks in Johannesburg, but the condition recommenced on his return to Durban.

Although opinion at the coast is unanimous that the perennial type of bronchial asthma and nasal allergy occurs with greater frequency and often with greater severity than in inland areas, there is by no means agreement as to the factors responsible. Indeed, the explanations offered are varied and often conflicting. Sufferers themselves sometimes assign causes for the periodic exacerbation of symptoms and blame weather, winds, rain or pollen. There is little disagreement however in the view that the majority of patients benefit on moving to the interior. The distance from the coast where such improvement occurs varies with different patients but, in general, improvement is noticed, and sometimes dramatically,

at higher levels towards the Great Escarpment (Fig. 1), where change in climate occurs. Respiratory allergy sufferers in Port Elizabeth and East London rapidly recover and maintain good allergic health in Cradock or Graaff Reinet. Indeed, in these inland towns there are schools in which a proportion of the scholars are from homes at the coast where they cannot live on account of bronchial asthma or nasal allergy.

From a consideration of the cases of perennial respiratory allergy studied at the coastal and inland towns of South Africa it is concluded that climate is the agent responsible for the precipitation of symptoms.

THE CLIMATE FACTOR IN PERENNIAL RESPIRATORY ALLERGY AT THE COAST

Climate is the cumulative weather state over a period of time and is the resultant of air temperature, barometric pressure, rainfall, relative humidity, hours of sunshine and so on. Further, climate is closely related to geographical features such as altitude and proximity to the sea or to mountain ranges.

The complexity of climate makes an analysis of its components necessary in order to identify those which may be of significance in the allergic health of man. The metereological data available have been studied from many points of view, and large numbers of charts based on such data were drawn in the attempt to define critical differences between inland and coastal climates.

Experience with patients in all parts of South Africa had lead to the opinion that the *combination* of high temperature and high atmospheric moisture-content was probably significant. This led to the drawing of further charts incorporating figures of absolute and specific humidity, rainfall, wet-and-dry-bulb readings with those of temperature. However, sufficiently characteristic climate patterns did not emerge.

The possibility was considered that a constantly warm and moisture-laden atmosphere could maintain a congested state of the nasal and bronchial mucous membranes and so increase susceptibility to the allergenic attack, or could perhaps render more highly allergenic otherwise harmless substances. It was thus desirable that a chart should indicate whether a person was living in warm, moist surroundings for all or part of the time, and whether he enjoyed periods of freedom from such conditions during part of the day or part of the year or both. Charts were therefore drawn showing average morning and afternoon temperatures and relative-humidity percentages for each month of the year. This type of chart seemed to fulfill the requirements and was adopted for the present study.

The structure of a climate pattern is shown in detail in Fig. 4, in which Kroonstad, a Highveld town in the Orange Free State, is represented. It will be observed that considerable metereological information is given in a single chart, viz. the average monthly temperature and relative humidity at 8 a.m. and at 2 p.m. throughout the year. A close study of the details is however not essential for a general understanding of the climatic conditions in any particular town. The resulting 'pattern' is obvious and striking. Thus, from a mere glance at the chart it is learned that in Kroonstad there is a wide

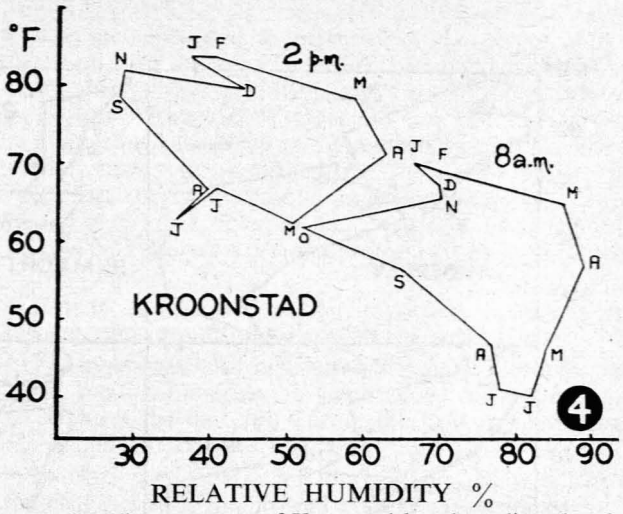

Fig. 4. Climate pattern of Kroonstad based on diurnal and monthly figures of temperature (°F) and relative humidity (%).

diurnal and annual range of temperature and relative humidity.

The climate pattern of a South African coastal town is quite different from that of an inland town and is characterized by a comparatively narrow range of temperature and of relative humidity through the day and during the year. The temperature range is approximately between 55° to 80°F and the corresponding relative humidity between 60 and 80%. Even a cursory look at the metereological chart of a coastal town reveals the typical 'compressed' climate pattern almost entirely confined to the upper right-hand quadrant, indicating high temperature and high relative humidity with little variation during the day and throughout the year.

In Fig. 5 the climate patterns of 10 inland and 5 coastal towns of the Union of South Africa are shown together for comparison. The coastal towns are represented in the vertical column on the right of the figure. The contrast is to be noted of the climate patterns of the inland towns with their wide and the coastal towns with their narrow ranges of temperature and relative humidity. Some of the inland towns in the Highveld (vertical column on the left) show a very marked change in the month-to-month temperature and relative humidity both for day or night whereas in other towns not on the Highveld (central vertical column) variations from month to month are not so great but the day-night variations are nevertheless pronounced. A study on these lines of the climate pattern of any town in South Africa should help the physician to decide whether his allergic patient whose symptoms are considered to be precipitated by climate may safely visit that town or should avoid it.

It is not sufficient to invoke altitude alone in explanation of the observed clinical differences in low-altitude coastal and high-altitude inland areas, because it is probable that perennial respiratory allergy of climatic causation also occurs in certain inland districts of South Africa. The humidity factor inland appears to

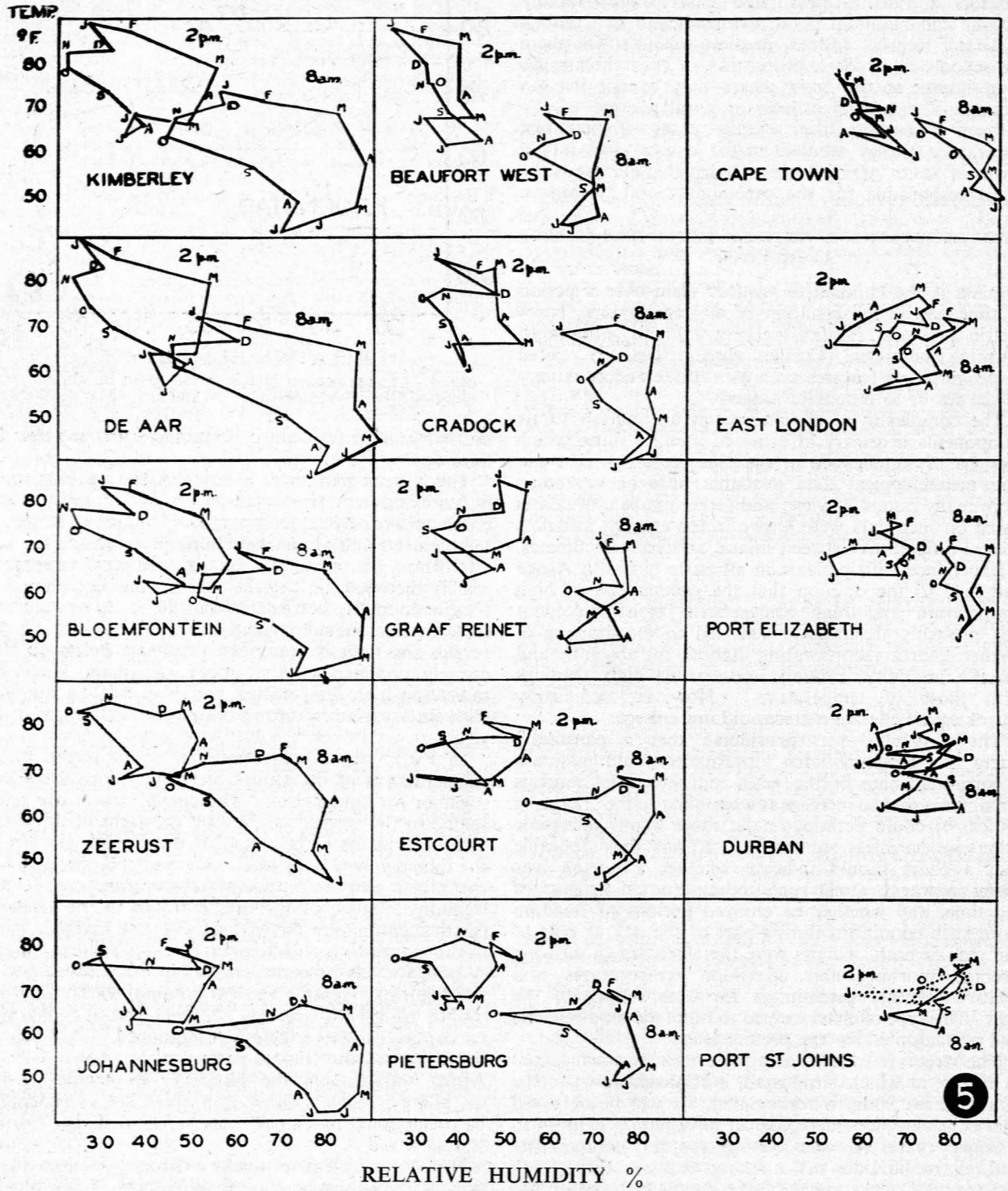

Fig. 5. The climate patterns of inland and coastal (*vertical column on the right*) towns of South Africa based on diurnal and monthly figures of temperature (°F) and relative humidity (%).

be associated with mists. The subject is being investigated and climate patterns of towns in the 'mist-belts' are in preparation.

It has been mentioned already that in the coastal towns of the Union, 'good' and 'bad' suburbs for asthmatic and nasal allergy sufferers are recognized. This subject is being studied, but it is not easy scientifically to confirm these clinical impressions because the relevant metereological data are lacking and because other possible explanations so far considered have not proved satisfactory.

THE CLINICAL APPROACH TO CASES OF PERENNIAL RESPIRATORY ALLERGY OF SUSPECTED CLIMATE ETIOLOGY

The problem of perennial respiratory allergy in South Africa initiated or aggravated by climate is not an easy one for the physician or his patient. The present diverse views on the etiology of coastal respiratory allergy result in frustrating attempts at control with drugs or by desensitization procedures on the basis of skin-test reactions. The knowledge that climate factors exist and may operate is a step forward. A clearly-defined approach to the patient becomes possible. The physician is on firmer ground with regard to the difficulties to be faced and realistically dealt with.

Patients who maintain reasonably good allergic health inland and tend to breakdown at the coast are well advised to avoid the coast. Even short visits there may precipitate allergic exacerbations which may continue for weeks or even months (Figs. 2 and 3). Coastal sufferers, especially children, should unhesitatingly be advised, where possible, to leave the coast and reside inland. The question of the optimum period of absence from the coast is as yet undetermined and must of course vary with different patients. There is some evidence however, that an absence of at least 2 years is necessary to reduce the liability to allergic breakdown. In any event in an inland area the patient will no longer be subjected to allergic depletion and will be given the opportunity of normal physiological progress. It is likely that the longer he remains free from the physical and emotional stresses of respiratory allergy the better will he be able to withstand the hazards of his return to the coast should this become necessary.

The approach to the allergy patient suggested above may prove a drastic one in some cases but until more is learned about simpler prophylactic and therapeutic measures avoidance of the coast, especially by young patients, must be insisted upon. Such a recommendation, however, which may involve considerable domestic, social and financial disturbance, should be made with the greatest circumspection after reasonable therapeutic trials and after thorough clinical and laboratory investigations have failed to reveal exogenous or endogenous factors in explanation of the continuance of symptoms.

SUMMARY

Seasonal respiratory allergy in South Africa is almost entirely a grass pollinosis occurring in the summer from October to March. Perennial respiratory allergy is due to exogenous and endogenous factors similar to those found elsewhere.

The incidence and the severity of the perennial type of respiratory allergy, including bronchial asthma and nasal allergy, are relatively great in the coastal areas of South Africa, more especially on the East Coast.

Numerous cases seen in Johannesburg and in various coastal towns are described and these demonstrate the fact that persons maintaining good allergic health inland may break down at the coast, and that symptoms in coastal sufferers are ameliorated or cease when they move inland.

Climate is regarded as the important exciting agent in perennial respiratory allergy at the coast.

The *combination* of high atmospheric temperature and high relative-humidity in constantly narrow range throughout the day and during the year appears to be the significant climate factor.

Marked and characteristic differences in climate patterns between inland and coastal areas are revealed in a series of charts based on these temperature and relative-humidity factors.

Climate patterns of the type shown may guide the physician in deciding which part of the country his patient should avoid or need not avoid.

The appreciation of the importance and significance of climate in perennial respiratory allergy should lead to a more clearly defined approach to the control of sufferers.

Patients who remain allergically well inland should avoid the coastal areas and sufferers at the coast should if possible live inland. In this connection the importance of a thorough preliminary investigation from the clinical and laboratory point of view cannot be too greatly stressed.

The writer gratefully acknowledges the assistance he derived in his studies of weather and climate in South Africa from conversations with Mr. B. R. Schulze of the Weather Bureau in Pretoria, Dr. W. Schaffer of the University of Cape Town, and Dr. S. P. Jackson of the University of the Witwatersrand. Professor J. H. Wellington of the University of the Witwatersrand kindly supplied relevant geographical information.

Acknowledgement is also made to Mrs. M. Etter, B.Sc., Mr. J. de Bruijn and Mr. M. Ulrich of this Institute for their assistance in the preparation of the charts for publication.

Especial thanks are due to numerous physicians, paediatricians, otorhinolaryngologists and general practitioners in Johannesburg, Cape Town, Port Elizabeth, East London and Durban, who very kindly discussed their problems with the writer and placed at his disposal for clinical and laboratory study many of their patients suffering from allergic respiratory conditions.

The metereological data were obtained from the report [6] of the Weather Bureau of the Union of South Africa, 1950.

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