

THE EVOLUTION AND PRESENT STATUS OF THE CONCEPTS AND PRACTICE OF ALLERGY IN SOUTH AFRICA

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INTRODUCTION

It was in December 1917 that the Town Council of Bloemfontein circularized the local medical practitioners for an expression of opinion whether the pepper tree (*Schinus molle*) was to blame for the 'epidemic attacks' of hay fever in the population, especially in the early summer after windy weather. The belief was then widespread that pepper trees were responsible, and the advisability of their eradication was being considered. These 'epidemics' were said to be very prevalent as well in many up-country towns, causing much discomfort and misery. In Kimberley, also, hay fever was being ascribed to pepper-tree pollen, but it was noted that in other towns in South Africa, including Pietermaritzburg, Grahamstown and Johannesburg, there was no serious hay fever in spite of the presence of these trees. Prof. G. Potts of Bloemfontein was invited to investigate the question and he subsequently described his findings.¹⁻³

From the evidence obtained by examination of the flowers, Potts thought that it was unlikely that the pollen was wind-borne. During the course of these enquiries a saline extract of the pollen was prepared for him by the South African Institute for Medical Research, Johannesburg, and Dr. J. H. Harvey Pirie reported that it was very difficult to get the pollen off since the grains appeared to be very sticky. This in itself, as well as the fact that the pollen grains are relatively large and mainly insect-borne, militates against the likelihood of the pollen being responsible for hay fever, which is almost invariably associated with the inhalation of wind-borne pollen. The pepper tree flowers in the early part of summer and it is not surprising that its pollen came under suspicion where the trees were growing in some profusion.

From our experience and later studies over the years it may be said that pepper-tree pollen is not responsible for, nor is it a significant factor in, summer hay fever, except possibly in occasional instances in persons living close to masses of these trees. But even then the likelihood is that the otherwise allergic nasal mucosa of these patients is non-specifically irritated by the dust resulting from the disintegration of the sticky anther-pollen masses from the flowers, which dry out in hot windy weather.

POLLENS

Some 10 years later, as a result of his studies, Pirie⁴ concluded that the pollens of the grasses and of certain composites caused summer hay fever in South Africa. In 1937 Prof. J. M. Watt,⁵ of the University of the Witwatersrand, confirmed these findings and thought that

the composite plant cosmos (*Cosmos bipinnata*) might be a factor in the symptoms towards the end of summer. Pirie,⁴ following the lines of workers in the USA, made extracts of various pollens in Johannesburg, carried out tests on local hay-fever sufferers, and prepared the appropriate extracts for desensitization purposes.

About 25 years ago, when it fell to me to take charge of the allergy studies and activities of this Institute, extensive investigations were commenced and continued through the years, with the cooperation of various authorities on plant life, into the vegetation distribution in South Africa. Interviews were arranged with local physicians, and also by correspondence with medical men in different regions of the country, with regard to their experience of patients with respiratory allergy. In addition, aerobiological investigations were made to determine the pollen content of the atmosphere in Johannesburg and later in various parts of the country during the different seasons of the year.

A number of 'pollen stations' have been established, where daily slide exposures are made in the Highveld (Johannesburg), in the Lowveld (Nelspruit), in the inland region of Natal (Pietermaritzburg), and in the East Coast region (Durban and district). For these investigations suitably-prepared glass slides are exposed to the atmosphere for 24-hour periods throughout the year. These slides are in due course returned to our laboratories for microscopic examination. In this way a knowledge of the qualitative and quantitative incidence of the various pollens (and incidentally of the fungi) of the air throughout the year is obtained. Our earlier findings⁶ were published in 1947 and have recently been brought up to date.⁷

It was established that in South Africa, pollen hay fever occurring in the summer (October - March) was caused by the pollen of the gramineae ('grasses') which flower at that time, especially in the Highveld regions which are the main 'grasslands' of South Africa. During that period the air contains abundant grass pollen. Sensitive persons enjoy freedom or alleviation of their symptoms when they move to or live in regions beyond the 'grasslands', including the coastal areas, in which there is relatively little grass.

Hay fever resulting from the inhalation of the pollen from the compositae occurs only occasionally, and mainly among gardeners, florists and others in close contact with the commoner garden flowers (asters, dahlias, daisies, sunflowers, etc.) and veld flowers (cosmos, arctotis, gazanias, Namaqua daisies, etc.) of this group of plants. In the USA weed pollinosis is of considerable importance, but it is of little significance in South Africa except perhaps from the few composite weeds — cosmos (*Cosmos bipinnata*), and khaki weed (*Tagetes minuta*) — which

flower in the late summer. The plant families — ragweed (*Ambrosiaceae*), goosefoot (*Chenopodiaceae*), pigweed (*Amarantaceae*) and artemisias — are not important here either because of their very scanty distribution or because of their occurrence in sparsely populated areas.

Pollinosis from trees occurs in the spring (August-October) when the more important trees — oak (*Quercus* spp.), plane (*Platanus* spp.) and poplar (*Populus* spp.) — are in flower. A few instances of spring hay fever have been observed from the pollen of the silver oak (*Grevillea robusta*). Hay fever which presented in the winter-spring period (May-October), as well as a number of cases of seasonal conjunctivitis, were shown to be due to the pollen of the cypress (*Cupressus* spp.).⁸ It is of interest to note that clinical and laboratory studies made with other members of the gymnosperms — pine (*Pinus* spp.) and cedar (*Cedrus* spp.) — showed that their pollens were rarely allergenic. The pollens of the acacias (*Acacia* spp.), gums (*Eucalyptus* spp.), and the jacaranda abundantly present in some towns, were also shown to be of no importance in respiratory allergy in this country. The pollen of the privet (*Ligustrum* spp.) is still under suspicion as an occasional additional factor in summer hay fever. The privet flowers during the summer when grass-pollen hay fever sufferers develop symptoms. If such persons show positive skin reactions to skin tests with privet pollen extract, the possible clinical significance of this pollen cannot be ignored, although the likelihood of such sensitivity is not great since the privet is insect-pollinated.

Reports had already come to hand in 1945 from various sources that there was a type of hay fever almost entirely confined to South West Africa which occurred during October and November. Investigations were carried out at the Institute, to which the patients were sent by their medical advisers, or in South West Africa itself, where under our guidance patients were submitted to specific skin testing and subsequent desensitization. It was soon established that the pollen of the prosopis tree (*Prosopis* spp.) was responsible for the condition.⁹ The prosopis occurs fairly commonly in certain parts of South West Africa and only occasional trees are found in South Africa.

The question of respiratory allergy in the Lowveld regions of the Transvaal has been intriguing for a number of years, since our attention was drawn to the fact that summer hay fever and asthma occurred throughout the summer as on the Highveld, but extended well into the winter. Visits were paid to Nelspruit in the Lowveld, the patients were seen in consultation with their doctors and studies were made with the cooperation of the Government Agricultural Officers and the staff of the Citrus and Sub-tropical Horticultural Research Station into the flowering times of the local vegetation. In view of the high temperature and humidity of the Lowveld region, grasses are in full bloom up to June and the pollen may be demonstrated in the exposed pollen slides. While this finding explains the prolongation of summer hay fever, a number of other problems in connection with the allergic subjects in the Lowveld still await elucidation.

FUNGUS ALLERGY

The spores and other elements of atmospheric fungi, like pollens, are known to be responsible for symptoms of

respiratory allergy. It was important, therefore, to determine as soon as possible whether or not such atmospheric fungi played a similar part in the symptoms of upper and lower respiratory allergy in South Africa. More than 60 varieties of air-borne fungi have been isolated for study in addition to atmospheric bacteria, and routine skin testing of patients has been carried out consistently, with extracts prepared in our laboratories from the commoner varieties. The first report¹⁰ that was issued about the air-borne fungi in Johannesburg revealed that in the 5-year period, 1950-1954, the principal genera of fungi were cladosporium (32.5%), yeasts (12.6%), alternaria (12.3%), penicillium (10.1%), epicoccum (10.1%) and phoma (8.3%), with rhizopus, nigrospora, stemphylium, trichoderma and acrepeira each contributing about 1.5%.

Analysis of the monthly findings of these atmospheric fungi did not show any significant seasonal incidence. This is of interest, since in Europe and the USA the increase of certain fungi in the atmosphere, especially in the late summer and autumn, serves to explain the occurrence of respiratory allergy symptoms during these periods. A later survey¹¹ covering the subsequent 5 years has been reported. The previous findings were confirmed, and again no seasonal incidence was noted except in the case of the yeasts, which showed a consistent increase each year in the winter-spring period (May-October). The significance of atmospheric yeasts in respiratory allergy is being studied. During the many years when slide-exposure studies were being made for atmospheric pollens, the fungi caught on these slides were examined at the same time. In the case of the commoner air-borne fungi there was again no evidence of seasonal incidence. Considerable quantities of smuts were recorded which, however, did show a definite increase in the early summer (October-December). Clinical and laboratory investigations are in progress to determine what part, if any, smuts in the atmosphere are playing in seasonal respiratory allergy in this country.

The air-borne fungi are constantly being studied, and extracts made from the important ones isolated are standardized for use in the skin testing of patients. Although a positive skin-test reaction is very frequently obtained, it has been quite uncommon to find a corresponding clinical sensitivity to account for it. This is at variance with experience abroad, more especially in Britain, Holland and the USA. In 1950 a case was described¹² of a man in Johannesburg who developed asthma whenever he slept on a particular mattress during his camping holidays. Appropriate culture of the mattress material revealed the presence of certain varieties of fungi to which the patient was sensitive by skin tests. This is one of the few instances in our experience locally of a clinical hypersensitivity to fungi. Investigations of atmospheric fungi and house dusts have been made in the coastal regions — Durban, Port Elizabeth, Cape Town, Lourenço Marques — and also inland at Pietermaritzburg, and will be reported in due course.

CASTOR-BEAN SENSITIVITY

It has been known for a number of years that the castor seed, from which castor oil is prepared, contains a very potent allergen capable of provoking not only skin lesions from contact with the seeds, but also severe symptoms of rhinitis

and asthma from inhalation of the dust. In 1950 a report¹³ was published describing South African instances of vasomotor rhinitis and asthma caused by the castor seeds. These were in farmers, storekeepers, laboratory workers, castor-oil mill employees, and others handling the castor seed as such or as an ingredient of fertilizer for use in farmlands.

In 1955 an 'outbreak' of asthma occurred in more than 200 inhabitants of a non-White township in the Transvaal in the vicinity of a castor-oil mill.¹⁴ A few such cases occurred simultaneously in Europeans in the district and in some of the employees of the oil mill. It was shown that this outbreak of asthma followed the introduction of a benzol extraction process to improve the oil yield from the seed, which had previously been submitted to simple mechanical pressure only. The residue after benzol extraction of the crushed castor seed was a dry powdery material which was readily windborne, and therefore inhaled by persons in the neighbourhood. The 'epidemic' of asthma ended when return was made to the original method of oil extraction, which left a cake of castor seed sufficiently oily to prevent its being dispersed into the atmosphere.

The cultivation of the castor-oil plant, a valuable crop for industrial purposes, has increased considerably in recent years in this country, especially in the Northern Transvaal. Visits have been paid to those areas in which cases of castor-bean sensitivity have been reported, in order to collaborate with the local physicians in the study of the persons affected and also to investigate the factors involved in sensitization. The people mainly affected were farm workers who handled the seeds and occasionally also those who have to do with the actual growing and reaping of the crop. It has hitherto been the custom merely to advise patients to make every effort to avoid such contact, because desensitization with the extract is not a feasible proposition in general practice. So potent is the castor seed as an allergen that even routine skin testing with this material or its extract may be hazardous. It has recently been shown by workers overseas that there is a common antigenic factor in the castor seed and in the fungus *spondylocladium*. The possibility of desensitizing castor-seed sensitive persons with extracts of this fungus of course demands investigation. This fungus is being obtained from abroad, and both experimental and clinical studies have been planned to determine the advisability of such non-specific desensitization.

INSECTS

In 1946 our attention was drawn to a man with asthma strictly confined to the summer months (October - March). Skin tests with grass pollen — the expected aetiological agent — and other possible summer pollens produced no reaction whatsoever. Indeed grass pollen extract caused no reaction when instilled into the conjunctivae or into the nostrils. This surprising finding led to closer enquiries. The patient was employed on a sewage disposal plant on the Witwatersrand and his place of work was visited. It was found there that numbers of the workmen used cloth masks to protect their mouths and noses from the numerous tiny insects that invaded the air. Dead insects were found piled up in heaps alongside the pillars of the sewage tanks and also against the walls. These insects were found to be *psychoda* ('sewage fly') which breed extensively and are present in the air only during the summer. Extracts of these *psychoda* produced a marked positive skin reaction in the patient. Subsequent specific desensitization proved satisfactory.

Investigations¹⁵ into the allergenic significance of *psychoda* were pursued, and visits paid to a number of sewage disposal plants on the Witwatersrand revealed 13 persons with suspected *psychoda* sensitivity. This investigation proved highly instructive in the sense that it made an investigator cautious of ascribing all cases of

strictly summer respiratory allergy necessarily to grass pollen. In overseas reports, persons with seasonal symptoms not confirmed by skin reactions to expected agents are nevertheless specifically desensitized, but are dismissed as 'non-reacting' subjects. It is obvious from our psychoda experience that there may be aetiological agents in seasonal syndromes other than those commonly recognized. In this country we have sometimes found summer respiratory allergy, especially in children, associated with the eating of summer fruits — peaches, apricots, plums and grapes.

Bees, however, are the most important insects giving rise to allergic symptoms in South Africa. A considerable number of patients are reported each year developing severe reactions to bee stings. The signs and symptoms range from small or large local swellings to generalized urticaria and angioneurotic oedema, as well as vasomotor rhinitis and asthma. There are in addition reports of anaphylactic shock with or without fatal outcome. The result of a preliminary study¹⁶ of this subject was published in 1951, and a later publication¹⁷ dealt with a larger number of patients and laid emphasis on the beneficial effects of desensitization by the intradermal method using extracts of whole bee.

Rather severe reactions are occasionally reported from the stings of *wasps*. Extracts made from the wasp body have given positive reactions, but the evidence so far of the value of specific desensitization is not adequate for conclusions to be drawn. The question whether the mechanism of wasp-sting reactions in Man is similar to that of the bee sting is under consideration.

Relatively severe reactions are sometimes also encountered from the bites of *fleas* and *mosquitoes*. Extracts of the bodies of both fleas and mosquitoes have been prepared for preliminary skin testing and desensitization purposes, but because of the relatively few instances coming to notice the value of such specific desensitization is still uncertain. Other biting insects reported to give rise to more or less severe reactions in people are now being studied.

CEREALS AND OTHER EDIBLE PLANT PRODUCTS

Nearly 20 years ago cases came to notice of vasomotor rhinitis and asthma apparently associated with the inhalation of cassava (*Manihot utilissima*) and buckwheat (*Fagopyrum vulgare*) flours, then being used by bakers and confectioners during a shortage of the usual cereals. A study¹⁸ of 3 such patients revealed that buckwheat, and not cassava, was the aetiological agent.

Over the years a considerable number of patients with respiratory allergy, especially farmers, millers and storekeepers handling the grain, as well as bakers and housewives using the flour, were studied, in whom it seemed likely that the inhalation of the cereal dusts was responsible for upper and lower respiratory allergy.¹⁹ These patients were studied personally and also by correspondence with their doctors in more distant parts of South Africa. Cereal dust sensitivity was confirmed, and it was shown that the symptoms resulting from the inhalation of the dusts of wheat, maize, rye and other cereals could be satisfactorily controlled by desensitization with extracts of the specific cereals. It should be emphasized that this desensitization is effective only if symptoms are from the *inhalation* of the dusts of these materials, but not from the *eating* of such cereals.

Lucerne²⁰ (*Medicago sativa*) is not a true cereal, but it is handled in considerable quantities in this country by farmers,

millers, storekeepers and others, and can similarly become a sensitizing agent causing respiratory allergic symptoms and in some instances urticaria as well.

WOOD

Allergic contact dermatitis caused by wood is fairly well known. In 1949 the first case of a respiratory allergy from the inhalation of wood dust presented itself.²¹ A cabinet-maker, a man of Bantu-Chinese stock, developed asthma only when handling certain woods, especially kejaat (*Pterocarpus angolensis*), Western red cedar (*Thuja plicata*) and a type of Congo hardwood. Specific extracts were prepared and skin tests revealed sensitivity to all of these, but not to a number of other wood extracts. Desensitization with the combined extracts of the woods satisfactorily controlled the patient's condition and he was able to continue his occupation without symptoms in the same circumstances as before. Later, a European man was completely desensitized against kejaat wood to which he was sensitive.²² The value of specific desensitization in respiratory wood allergy was thus confirmed.

URTICARIA

Not infrequently patients suffering from urticaria are sent to these laboratories for skin testing to determine the aetiological factors. A paper was published on urticaria,²³ indicating lines of approach and the difficulties associated with diagnosis and therapy. It was there emphasized that urticaria was often not an allergic condition, in the sense of an antigen-antibody reaction. In our experience urticaria after a short or long interval follows the administration in some persons of penicillin, other antibiotics or other drugs. Psychogenic factors must always be taken into consideration and food-elimination trials may have to be resorted to. A thorough clinical examination of the patient with the appropriate laboratory investigations is often essential in the determination of the aetiology.

PERENNIAL VASOMOTOR RHINITIS

Vasomotor rhinitis of the perennial type may be associated with exogenous factors such as animal contacts, feathers, house dust, foods, etc., but complex endogenous factors are more frequently involved — psychogenic, hormonal and other. The approach to the diagnosis and treatment of the different forms of vasomotor rhinitis has been described,²⁴ and a plea made for the condition to be regarded not as a local nasal disease, but as a general disturbance of the psychological pattern of the patient, in whom nasal symptoms predominate.

ENDOCRINE ALLERGY

In 1957 a paper was read to a group of local medical men on our experiences with allergic conditions of the skin and the respiratory tract in women where the signs and symptoms were precipitated or markedly aggravated pre-menstrually or during menstruation. Examples were given of women with a pre-menstrual rash controlled by desensitization in the intermenstrual period with the patient's own blood serum taken at the time of symptoms and which presumably contained the hormonal substances to which there was sensitivity.

In the same year an interesting article appeared by Cochrane²⁵ on endogenous endocrine allergy. He emphasized that the concept of endocrine allergy provided a method of investigating the otherwise obscure forms of menstrual, puberty, pregnancy or menopausal allergy and a cure or amelioration for 50-60% of those patients sensitive to their own hormones for whom no real hope could otherwise be offered.

CHILDHOOD ALLERGY

Attention has been devoted over the years to the study of allergic conditions in childhood in South Africa, and our

findings in more than 900 children were reviewed in 1958.²⁶ An allergic syndrome of infantile eczema has long been noted, usually commencing in the first year of life, followed by nasal allergy in childhood and subsequently by asthma after adolescence. The existence of this syndrome was confirmed for this country and details were given of the ages in which respiratory and skin allergic disorders commence and tend to cease in children. The desirability was emphasized of controlling allergic symptoms as early as possible in childhood, not only to relieve present suffering, but also to prevent the occurrence of more serious symptoms in later life. Attention was directed to the importance of making every effort to seek out and eliminate allergenic foodstuffs, to control the effects of inhalant allergens by avoidance or specific desensitization, and to recognize and deal with psychological influences.

RESPIRATORY ALLERGY APPARENTLY ASSOCIATED WITH CLIMATE

Over the years the interesting fact was repeatedly observed that there are persons living in the Highveld of the Transvaal and Orange Free State who on visiting the coast, more especially the East Coast (Durban, Port Elizabeth, East London and Lourenço Marques), develop vasomotor rhinitis or asthma soon after arrival there or, if already sufferers from respiratory allergy, find their symptoms exacerbated. With the return inland symptoms disappear or at least improve. Similarly, patients of this group resident at the coast find relief when they travel inland. Possible explanations have been investigated, including the regional differences in vegetation types, qualitative and quantitative differences of the atmospheric moulds, and direct 'climate' effects.

Visits have been paid to most of the coastal towns of South Africa to interview the doctors and to study the patients. Opportunity was always taken at these places to expose plates to the atmosphere for the study of the local fungi and to expose slides for the determination of the local pollens. In addition, with the cooperation of the Weather Bureau, climate differences in the various regions of the country have been closely studied. The outcome of these enquiries has been published at different times.²⁷⁻³²

The pollen of the coastal areas comes mostly from insect-pollinated semi-tropical plants, and is thus unlikely to be the cause of symptoms; indeed, specific skin tests did not reveal sensitivity to these pollens. There certainly was a considerable amount of fungus present in the homes of coastal residents, where not infrequently clothing, leather goods and other articles were covered with moulds. Nevertheless, culture plates exposed to the atmosphere and in the houses did not reveal the presence of fungi different from those in other parts of the country. In other words, it did not seem that either fungi or pollens could be incriminated as the precipitating agents of respiratory symptoms at the coast in this 'climate' group of persons.

Attention was therefore directed to the question of 'climate' itself as a provoking factor in these persons. Large numbers of charts were drawn, comparing the climates of inland and coastal regions in South Africa. These revealed the striking difference that at the coast both temperature and relative humidity are high and in narrow range throughout the 24 hours and throughout the year. In the Highveld, on the other hand, there is a consistently lower temperature and relative humidity, both

in wide range. This graphical method of demonstrating essential climate differences proved so helpful in respiratory allergy studies that a description was subsequently published.³³

It was obvious, however, that to assign the greater severity in respiratory allergy in the coastal regions to 'climate' had little value, since this lacked indication of any mechanism in the aetiology. 'Climate' is a wide term and involves a multitude of factors. While humidity appeared most important, other possible factors remained to be considered. An interesting finding in this 'climate group' of allergy patients was that strongly positive skin reactions were obtained almost invariably on testing the patients with extract of house dust. The question arose whether coastal house dust was of significance and whether its potency differed from that of inland house dust.

House dusts from Durban and other coastal towns and from inland regions were therefore collected and extracted in identical manner. It was found on testing patients with these extracts that a skin reaction obtained with the inland extract could be elicited with a much higher dilution of the coastal extract. This finding was a consistent one in a series of trials, some of which included the use of the purified protein antigens prepared from these different dusts. In other words, it became evident that coastal house dust is more allergenically potent than inland house dust. Investigations are in progress relating to the essential difference between inland and coastal house dusts with regard to fungus content, human dander content, chemical and physical constituents, etc. The problem, however, still remains as to the reasons for the greater allergenic potency of coastal house dust.

The first possibility that suggested itself was that in warm, humid regions, e.g. on the East Coast of Southern Africa, the abundant bacteria and moulds had a biological action on the house dust and so enhanced its potency. This hypothesis, however, was discarded when reports came to hand that fungi in fact could live on and thus reduce the potency of house dust. Our present concept is that in the Highveld of South Africa the great amount of ultraviolet light there may act on the protein elements of the house dust and so reduce its allergenicity. In other words, it is likely that coastal house dust is allergenically 'normal', but its potency is reduced elsewhere under the influence of ultraviolet light. Experimental studies are in progress in which house dust obtained from the coast is exposed to sunlight, ultraviolet light and other rays, to discover whether or not such potency is in fact reduced. There is evidence of benefit after the use of extracts of coastal house dust in desensitizing patients of the 'climate' group. The question of the effect of air pollution is also being considered and comparative studies are being made of the air pollution in the coastal port town of Durban and the Highveld town of Bloemfontein.

In the course of the study of the literature relating to the influence of climate elements on respiratory allergy, it was found that there were as many views on the subject as writers. The opinions expressed — or more correctly, 'impressions' — appeared so conflicting that no clear-cut line of thinking emerged. The question was considered of

the possibility that atmospheric ionization could be playing a part in the precipitation of asthma under different circumstances and that, in fact, such ionization was the unifying factor in the conflicting statements of various workers on the influence of the gross climate and weather changes — temperature, humidity, atmospheric pressure, etc. — on respiratory allergy.

During visits abroad, interviews with workers, especially in Spain, Holland, Israel and Brazil, showed that there was recognition in a general way of the exacerbation of symptoms in some persons at the coast. No clear explanation of the mechanism, however, was advanced anywhere. It was invariably assumed that the fundamental aetiological factors were the atmospheric fungi and the moulds in the houses of the patients. As already indicated, this is an unacceptable hypothesis in the light of our South African experience. A number of papers dealing with climate and respiratory allergy and the house dust factor were published,²⁷⁻³² finally laying down as a basic universal principle that (a) there is a group of persons everywhere whose symptoms of respiratory allergy are exacerbated at the coast, and (b) the greater potency of the house dust there was a factor in the precipitation of these symptoms at the coast. During the years since then corroboration of these ideas has been obtained from various parts of the world by correspondence and in publications.

In connection with our climate and other studies, visits of investigation have been paid on a number of occasions to Durban, the important harbour city on the eastern shores of South Africa, to study allergic respiratory conditions there. Durban is a particularly suitable natural clinic and laboratory for that purpose. The climate is sub-tropical with a high temperature and humidity, and 4 population groups — White, African, Indian and Eurafican — reside there side by side, with their different food and living habits.

A visit of some weeks' duration was paid to Swaziland in 1956 in order to investigate the vegetation distribution and the climate characters in different parts of that territory adjoining South Africa. There is evidence that in certain parts of that country asthma has a high incidence. It is sometimes observed that persons travelling through Swaziland from the Highveld of the Transvaal are liable to develop asthma on entering certain parts of the country. A visit was paid to Lourenço Marques and district at the invitation of the Government of Mozambique to investigate problems of respiratory allergy there.

In view of the close association of climate factors and certain allergic conditions, close contact has always been maintained with persons and associations interested in the relation of climate and health. It is in this connection that I was elected Chairman of the Committee of Human Diseases and of the Subcommittee — 'The Relation of Climate to Allergic Diseases' — of the International Society of Biometeorology. The organization of the sessions is in progress on these themes for the forthcoming Congress this year, when it is hoped information of value will emerge from the discussions by authorities on the influence of climate and weather on human diseases in general and on asthma and allied respiratory disorders in particular.

ALLERGIC CONDITIONS IN THE NON-WHITE

Investigation into the allergic condition of the Bantu population in South Africa presents some difficulty, not only because an interpreter is often required for intimate detailed enquiries, but also because an accurate clinical history is not always easily elicited from these patients. Studies have been made in collaboration with medical men at hospital clinics with regard to the occurrence of vasomotor rhinitis in the Bantu. Skin tests were carried out, but correlation between these and clinical symptomatology does not occur as consistently as in the White population.

Asthma is comparatively uncommon in the Bantu and during the course of investigation at clinics at certain of the Bantu townships, it was mainly women patients who presented with asthma. It is still not certain whether there is indeed a true preponderance of asthma in women or whether the men who leave the townships to work in the cities receive medical attention there. Urticaria is quite uncommon in the Bantu peoples, and in the Bantu miners on the Witwatersrand goldfields urticaria is seldom seen, and chronic urticaria and angioneurotic oedema practically never.²³ Urticarial and other reactions to penicillin injections are also seldom met with. At present the explanation of these interesting findings is being sought.

Studies have been made in Natal with its large Indian population at various times over the years, and quite contrary to the position in the Bantu there is a high incidence of vasomotor rhinitis and asthma in these peoples. In general the Indian people tend to be rather highly-strung, and the psychological aspect is undoubtedly a factor in these cases. Further, since much of their food is different from that used by Whites, the possibility of clinical sensitivity to special foodstuffs must be considered.

IMMUNOLOGICAL ASPECTS OF ALLERGY

Immunological problems of various kinds constantly present themselves in the laboratories of the allergy department. Some relate to the question of the possibility of the presence of common antigens or allergens in the substances producing positive skin reactions in patients. The need for such trials emerges in circumstances where a patient, for example, suffering from summer grass pollen hay fever, and giving a positive reaction to grass pollen, nevertheless gives a positive reaction also to the pollen of the compositae group of plants. Clinically, desensitization with grass pollen extract alone is effective. Is there a common antigen in the widely different botanical genera of plants, such as the gramineae and the compositae? Sera from animals inoculated with these pollens are being tested for possible cross-antigenicity. Not infrequently summer hay fever grass-pollen-sensitive patients also show a positive skin reaction to privet pollen. Here again the possibility is being studied, by testing the patient's serum, whether privet pollen does indeed play a part in the summer incidence of hay fever, more especially if the patients live in close proximity to privet trees or hedges. Since the 'non-precipitable' antibodies in allergic conditions are not easily demonstrated, various techniques are being employed to study the sera of allergic subjects and of those who have been satisfactorily desensitized.

AUTO-IMMUNE ('AUTO-ALLERGIC') DISEASES

For more than 20 years now, Gear and Zoutendyk,³⁴⁻³⁹ of this Institute, have been investigating the role of auto-antibodies and what they have called the 'hyper-reactive auto-allergic state' in the pathogenesis of disease.

They have established that infections, bacterial and other toxins, drugs and other chemicals, as well as physical agents, may render a tissue or cell auto-antigenic. Their experimental observations have supported this hypothesis — thus, animal tissues altered by yellow-fever virus infection or by neoarsphenamine, become antigenic when inoculated into another animal of the same species. Various blood dyscrasias, including acute haemolytic anaemia, acute agranulocytosis and acute thrombocytopenic purpura, may be produced experimentally in animals by the inoculation of the appropriate antiserum. Blackwater fever, it was suggested, resulted from an autohaemolysin produced by the antigenic action of red blood corpuscles altered by malaria infection, with possibly also a drug effect.

Electrophoretic and other studies have shown that the sufferers from these conditions are in a hyper-reactive state characterized by an excessive production of gamma globulin and often abnormal globulins. It is suggested that rheumatic fever, acute disseminated lupus erythematosus, dermatomyositis, Stevens-Johnson syndrome and exfoliative dermatitis, rheumatic pneumonitis, and some cases of asthma, glomerular nephritis, ulcerative colitis and many other somewhat obscure conditions, including some hormone deficiency states, may also be auto-allergic diseases.

DESENSITIZATION IN RESPIRATORY ALLERGY

In 1961 a paper was published on a method of desensitization in allergic conditions, involving the intradermal administration of the allergen.⁴⁰ This procedure has been in use in South Africa for many years, in contrast to the general use of the subcutaneous method in other parts of the world, and successful desensitization is invariably accomplished when the specific elements associated with the allergic condition are known and are represented in the desensitizing extracts. Further, by this technique severe reactions are avoided and relatively small quantities of material are used for such desensitization. Experience has fully justified this method which we have accordingly fostered assiduously so that it is now, with few exceptions, used throughout the country.

THE PRACTICE OF ALLERGY IN SOUTH AFRICA

In the allergy laboratories of this Institute the preparation of protein extracts — inhalants, foods, bacteria, etc. — for skin testing and desensitization purposes is constantly going on. All the materials are from local sources, and much organization and effort are directed to the collection of flowering plants in season for the separation of the required pollens, and in the trapping, culturing and isolation of the important specific fungi in the atmosphere.

It is of interest to note that the issue of these extracts from the Institute for testing and desensitization purposes has shown a steady and marked increase over the years. This can justifiably be taken to reflect the increased interest in allergic conditions by medical practitioners throughout the country. In the earlier days the knowledge of allergy and the use of specialized allergy techniques were limited to a few medical men only. The publicity given to the subject of allergic disorders by the Institute (which has made and continues to make a special study of this subject) by means of lectures, addresses to and correspon-

dence with doctors throughout the country, and also by its leaflets, pamphlets and medical publications,⁴¹⁻⁴⁷ has undoubtedly contributed largely to the spread of information to the medical public concerning the basic principles of allergy and the knowledge of the clinical and technical approach to allergic patients.

With regard to the handling of allergic diseases by medical men, it must be emphasized that 'allergy' is not a 'specialty' in South Africa. General practitioners throughout the country, in constantly increasing numbers, have developed interest in allergic problems and are testing and desensitizing their patients when indicated. Nevertheless, there still exists considerable misconception of the theoretical and practical aspects of allergy, leading to diagnostic inaccuracies and therapeutic disappointments. Not infrequently a naïve view is expressed, and with regard to asthma reflects a lack of understanding of the kaleidoscopic pattern of exogenous and endogenous factors that may be involved in allergic disorders. There are one or two physicians in the bigger centres of this country whose clinical practice is largely devoted to the investigation and control of allergic disorders. This is all to the good, since a sound basis of medicine with specialized knowledge is essential in the approach to allergic patients.

In recent years some of the larger hospitals have appreciated the importance of allergy, and have established allergy clinics or asthma clinics. These clinics augur well for the study of allergic disorders in patients and for their adequate treatment and control. It is, however, not enough to have a department where skin testing and desensitization procedures are carried out by non-medical, or even medical staff, who are but superficially acquainted with, or only casually interested in, allergy. With a proper allergy clinic conducted in cooperation with the physicians, otorhinolaryngologists, paediatricians, dermatologists and other specialists of the hospital, much more could be accomplished for the patients. There is little doubt that it would be to the advantage of medical students if more time and opportunity were made available to them to become better acquainted with the theory and practice of allergy. Since allergy involves an understanding of immunological principles, a sound basic knowledge of immunology should be acquired in the preclinical years, followed later by instruction in the field of clinical allergy.

SOUTH AFRICAN PUBLICATIONS ON ALLERGY

The following briefly outlines the publications by medical men in South Africa in the last decade on subjects relating to allergy.

Asthma

Walt,⁴⁸ in Durban, described his 2½ years' experience of an asthma clinic for children, established to study the patient, his disease and his environment at leisure. A comprehensive history was taken and full laboratory and clinical examinations were carried out, including an assessment of the personality of the child, his place in the home and his relationship to siblings and parents. Treatment consisted of breathing exercises, advice to the mother on her attitude to the patient and to the disease, and the use of anti-asthma drugs. Remarkable improvement was demonstrated. Emphasis was placed upon the fact that psychological factors play a major part in asthma in children.

Helman,⁴⁹ discussing asthma in young boys, considered the clinical picture of asthma in the 8-18 years age group to be different from that in children under 8 and over 18 years.

He described infective allergic and nervous types of asthma and averred that in adolescents the treatment was the same for all types. He gave a regime for therapy and emphasized the importance of controlling psychological as well as physical factors and advocated breathing and postural exercises.

Goldwater⁵⁰ briefly discussed the basic clinical, pathological and therapeutic facts, as well as the aetiological factors in asthma. With regard to control, the author argued that, while recommending the removal of allergens from the patient's vicinity, it was usually unnecessary to reduce a room to spartan austerity, since a bedroom should be a place of rest to permit and induce a relaxed frame of mind. Posel,⁵¹ in a letter to this *Journal*, referred to cases of status asthmaticus in middle-aged people. The experience of 4 cases with a fatal outcome was entirely different from that gained in previous years where clinically similar cases all recovered on expectant therapy. The fatal cases had in common previous treatment with corticosteroids. He was of opinion that this common factor was possibly of significance and was anxious to elicit information on the subject from other clinicians.

Dagleish,⁵² discussing orthodysarthrics, thought that asthma, where no allergic factor is found, is basically caused by thoracic neurodocitis—because interference with the alignment of the spinal column in the dorso-lumbar region caused a stimulation of the delicate pre-ganglionic fibres. He recommended the correction of scoliosis found in an asthmatic child as a prophylactic measure against asthma becoming a habit in adulthood.

Botha⁵³ thought that tracheotomy in status asthmaticus may be life-saving in some instances by significantly diminishing the dead-space volume which increases the alveolar ventilation, thus allowing the escape of accumulated carbon dioxide, with the additional advantage of clearing the bronchial secretions. Tracheotomy is not to be left as the last resort, but should be performed when it becomes evident that the patient cannot clear mucus from his airway or when symptoms or signs of hypercapnia supervene. Medalie⁵⁴ thought that steroids should play a greater part in the treatment of asthma and should be used early in the disease and also in cases of moderate severity. Heese⁵⁵ described the forced expiratory volume and forced vital capacity tests in asthmatic children in assessing the severity of impairment of the ventilating function. Murray⁵⁶ described a trial of 3 different methods of treatment of children with chronic asthma, and although he did not come to definite conclusions he felt that even children with the most severe asthma may not be so hopelessly unamenable to treatment as is commonly thought.

Nasal Allergy

Bellon⁵⁷ gave an outline, from the point of view of the rhinologist, of the basic mechanisms and the treatment procedures in allergy. He thought that the extrinsic antigenic factors and the demonstration of the antigen-antibody reaction had been overemphasized in allergic conditions. Fine⁵⁸ reported on some aspects of purulent sinusitis on the Witwatersrand. He found that in 471 patients with nasal diseases 35% were confirmed sufferers from nasal allergy, and of the remainder another 35% were victims of purulent infections. He thought that chronic purulent sinusitis followed an unresolved acute attack because of inadequate drainage, virulent infection or poor host resistance. He recommended conservative treatment, but radical surgical interference was necessary in irreversible cases. He was against the use of vasoconstrictors since these caused ultimate stasis with engorgement of the cavernous tissue, resulting in a type of paralytic stagnation with marked nasal obstruction.

Williams⁵⁹ discussed the postnasal drip syndrome and the mechanism behind the sequence of events in this condition. He recommended the eradication of chronic upper respiratory infection and the provision of adequate drainage. Jarvis⁶⁰ discussed the climatic and racial factors in vasomotor rhinitis

in East Africa in Indians and Whites over a period of 20 years. The possible aetiological factors suggested in this condition were: psychological—associated with a trying climate; allergic—with house dust as an allergen (as shown by Ordman); and physical allergy—where the tropical climate itself might be responsible for the development of abnormal reactions in the nasal mucosa.

Ocular

James⁶¹ discussed the ocular manifestations of allergy and emphasized the disagreement regarding the allergic nature of vernal conjunctivitis because of limited knowledge of the subject.

Contact Dermatitis

Marshall⁶² (with Garnier) stated that cutaneous lesions from the use of cosmetics were generally due to sensitization. The emotional state of the individual and the hormonal imbalance could nevertheless be factors in some cases. The diagnosis may be difficult in some instances when a secondary dermatitis medicamentosa had been produced by improper treatment with local applications of various drugs.

The first South African cases of poison ivy dermatitis were described by Ross⁶³—this plant (*Rhus radicans* Linn.) had caused 8 cases of self-limited but severe dermatitis in the previous 3 years. A positive patch test confirmed the diagnosis. Kooij⁶⁴ discussed contact dermatitis due to neomycin. Seven such cases were described and in one, caused by streptomycin, positive patch test reactions were obtained with 6% neomycin in paraffin molle. Cross-reactions were found to various other antibiotics. A warning was given against the indiscriminate local use of neomycin, since this might make it difficult, because of a cross-sensitivity, to use other antibiotics systemically for other conditions.

Antibiotics and Antihistamines

Goldwater⁶⁵ briefly described the public health aspects of penicillin allergy and thought that the intrusion of penicillin into public health had occurred mainly through its use by dairy farmers in the treatment of mastitis. He emphasized the need for investigations into the preparation of a penicillin fraction active antibacterially, but free from allergenic factors. Davidson⁶⁶ issued a preliminary report of the excellent results he had obtained, in 75% of 20 patients seen in general practice, with the use of 'polaramine' in the treatment of a variety of allergic conditions. Dale⁶⁷ described the interactions between histamine, acetylcholine and other muscular stimulants in the guinea-pig ileum. Helman⁶⁸ reported his clinical impressions of 'actived' in 7 patients with asthma.

Ulcerative Colitis

Mirvish^{69,70} found that in patients examined during a remission of ulcerative colitis an oedema developed within a few seconds to a few minutes after light pressure was applied to the normal-looking surface of the mucosa. He concluded that the mucosal oedema was a primarily local hypersensitivity reaction with ulceration and inflammatory reaction as secondary phenomena. He described the types of ulcerative colitis found as well as the pathology and prognosis of the condition and detailed the therapeutic approach, including blood transfusion, high-protein diets, sedation, the use of antibiotics, corticotrophin, and corticosteroids, psychotherapy, surgery and specific treatment for abdominal pain and vomiting.

Miscellaneous

An interesting report was presented by Barlow *et al.*⁷¹ on an epidemic of 'acute eosinophilic pneumonia' following 'beer drinking', which they thought was probably due to infestation with *Ascaris lumbricoides*. They suggested that the illness itself, including the urticaria, small interlobar effusions, eosinophilia and severe asthma, was an acute allergic reaction caused by the swallowing of an unusually large number of ova.

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