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THE ALLERGIC CHILD*

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Of necessity this paper must deal with the general rather than with the particular; so the term 'child' must include any young human, male or female, from birth to the age of 16 years. This upper age is included to allow reference to be made to a few of the complications arising under the influence of adolescence. Perhaps the foetus should be included too, for if we could find some prophylactic treatment for our potentially allergic baby the work and worries of parents, nurses and health visitors would be eased considerably. Various authors have given figures varying from 10 to 75% for inheritance of allergy, but any survey must depend upon the thoroughness of our delving into family medical histories and upon our ever-widening knowledge of the range of allergic manifestations in the different organs of the body.

A recent outstanding contribution to the study of inheritance in allergy is that by Schwartz (1952). He concluded that asthma is an inherited disease and that a genetic relationship exists between asthma and vasomotor rhinitis, Besnier's prurigo and hay-fever. To Schwartz it seems possible but not very probable that urticaria and angioneurotic oedema in females may in certain instances be genetically related to asthma, but that eczema, migraine, psoriasis, gastro-intestinal allergy, ichthyosis and epilepsy are not. Schwartz considers the age of onset of asthma to be independent of inherited predisposition and rejects the theory of Wiener, Zieve and Fries (1936). Ratner and Sullivan (1953) reviewed the work of Schwartz and of others and from this and their own material concluded that no genetic hypothesis fits all the data. In the words of D. A. Williams of Cardiff, 'The present position appears to be much confused and worthy of deep thought'. Bowen (1953) over a period of 15 years observed 59 pairs of identical twins. He found co-existing allergies in twins to be the exception. In 52 cases the allergic condition existed in only one twin and in only 7 instances was there a true bilateral allergy of similar pattern.

An Experiment in Prevention

Twelve years ago 40 pregnant mothers who were all known sufferers from allergic asthma were persuaded to undergo a 6 months' course of desensitization during their pregnancy with the hope of desensitizing the foetus too and so avoiding the production of more allergic children. Most of these mothers were so pleased with their healthy babies that they insisted, in subsequent pregnancies, on further detailed investigation and desensitization. Up to date the 40 mothers have produced 93 children, with only 3 cases of obvious allergy amongst them; many of these children are already 11 years of age. Even the most sceptical statistician would have expected that 15 would have developed eczema or hay-fever by this date. However, this really proves nothing; we must treat it as a long-term experiment and review the same families 20 years hence.

The First Year of Life

Let us proceed to the infant in its 1st year of life. It is known that in early infancy the Schick test is unreliable as a guide to the level of immunity to diphtheria; but Payling-Wright and Clark (1946) have shown that the low reactivity of new-born infants' skins to diphtheria toxin is not due to any insensitivity to histamine or to inability to exhibit the typical triple response on injury. They state, 'Since similar anergy is found in other forms of delayed response at this age, such as that produced by ultra-violet light, the mechanism underlying these responses may differ from that concerned with immediate reactions, and may not become fully functional until some weeks after birth. It seems likely that the lesser skin reactivity seen in delayed reactions in infants is partly due to the relatively rich and superficial vasculature of their skins, which would facilitate the escape both of injected substances and of vasodilator products of injured tissues'. So much for

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the delayed immunological reactions; but it is just this rich vasculature which makes it necessary, when looking for the *immediate* response to allergy tests in a young infant, to use the 'prick test' and to take one's readings after 3 minutes, not, as with adults, after the usual 10 minutes.

From Tables I and II (cases 1 and 2) it will be seen that, given the right technique and the right solutions, it is possible to get the correct answer to tests on babies of 3-6 weeks, and that these food allergies can be confirmed at 6 months and at 1 year of age. Both these

TABLE I. CASE 1. A.L. ECZEMA OF FOREHEAD AND CHEEKS AT 6 WEEKS. PRICK TESTS.

	6 *Weeks*	6 *Months*	1 *Year*
Milk	—	—	—
Egg	++	+++	+++
Orange	—	—	—
Fish	—	—	—
Wheat	—	—	?+
Meats	—	—	—

TABLE II. CASE 2. BABY S. GENERALIZED ECZEMA FROM 2 WEEKS. ASTHMA FOLLOWING A HEAD COLD AT 3 MONTHS (JUNE). PRICK TESTS

	3 *Weeks*	3 *Months*	1 *Year*
Milk	—	—	—
Egg	—	—	—
Fish	—	—	—
Orange	—	—	—
Mixed vegetables	++	+	++
Parsnips	+++	+++	+++
Other vegetables	—	—	—
Pollens	—	++	++

babies were breast-fed and one must presume that the egg protein and the parsnip protein were ingested by the mother and that the allergenic part of the molecule was transmitted in the milk. The mother of baby S. (case 2) gave a history of being excessively fond of parsnips and of eating them daily.

Under what circumstances are we going to attempt to find an allergy as the cause for ill-health in our infant and young child? Manifestations of allergy may be *obvious*, as in eczema or asthma, or may be *obscure*, as in cyclic vomiting, in early migraine, or in gastro-intestinal allergy, sometimes called indigestion, but all too often labelled acidosis for want of a better word.

OBVIOUS ALLERGIES

Let us consider the *obvious* allergies first. Many doctors when confronted with an irritable, cross-tempered child, rubbing and scratching its own skin, a misery to itself and its parents, or with a hunch-backed, pigeon-chested, wheezing child, now think in terms of allergy or of psychology, but seldom realize the combination of the two. Shakespeare must have had some experience of these children, to write with such feeling in his 'Seven Ages of Man': 'At first, the infant, mewling and puking in the nurse's arms. Then the whining school-boy, with his satchel and shining morning face, creeping like snail unwillingly to school'.

Which comes first, the skin irritation or the bad-temper? There can be any possible combination from 100% allergy and 0% psychology to 100% psychology and 0% allergy. From cases 3-6 you will see that after removal of the offending allergen, the personality changes rapidly for the better; perhaps the allergy was more than skin-deep, and directly responsible, originally, for the temperament; but so far we have no proof. However, we must decide that all such children should be investigated and if possible told what to avoid.

Case 3. W.P., male, aged 2½ years. Normal babyhood except slight eczema, which developed when aged 6 months and gradually became more widespread during the next 2 years. Considered by mother to be a bad-tempered baby compared with his 2 elder brothers. Some scarring of face and neck due to scratching. Allergy tests: *chocolate* +++, *beans* ++. Five treatments with 2 c.c. histamine by electrophoresis 1 milliamp for 10 minutes, at the rate of 2 doses per week, needed to control irritation (Walker 1954). Advised to continue avoiding chocolate and beans in diet and come for desensitization by injection when aged 6. If eczema due to some other food develops during the next few years, this patient should have another course of histamine treatment immediately.

Case 4. A.W., female, aged 3. Mother described her as a very healthy, contented baby, normal in every way, until weaning was begun at 6 months. Gradually became difficult to manage, with indigestion, poor appetite and sleeplessness. By 8 months was covered with an itching eczema. At 2½ years was a puny child with hard dry skin and some haemorrhagic patches due to scratching. Owing to fact that trouble began at weaning, the mother had tried goat's milk with some success but had still used cow's milk in cooking puddings. At this stage allergy tests showed: *Cow's milk* ++++, *cheese* ++++, *fish* +++. Six treatments with histamine by electrophoresis at the rate of 3 a week for 2 weeks stopped the irritation, healed the skin, and apparently reduced the degree of allergy, for a re-test showed: *Cow's milk* ++, *cheese* ++, *fish* —.

Case 5. E.S., female, aged 6 years. Infantile eczema since 4 months old, tending to be worse in winter. Very difficult, ill-tempered child, especially since going to school 1 year ago. Other children said she must have 'fleas' because she scratched her face, neck and back until blood appeared on her fingers. Allergy tests: *Chocolate* +++, *fish* +++. After avoiding those foods for 4 weeks all lesions had healed, but now she was teased because she could not eat her school dinners. Ten treatments with histamine during the Christmas vacation (3 weeks) have reduced her allergic state to a minimum. She now eats fish and chocolate, but has been advised to avoid the routine cod-liver-oil next winter.

Case 6. D.E., male, aged 3. *Slight eczema* since 6 months old, now getting much worse and localized to eyelids and back of neck. Irritation, especially at night. Only time ever clear was when upstairs in bed with high temperature, on fruit juices only. Allergy tests (17 February 1953): *Cow's milk* ++, cat fur ++, dog hair +++. Given goat's milk in diet and animals removed from home. On 17 March 1953 symptom-free. Skin clear for first time since 6 months old. Sleeps through the night. On 8 August 1955, still symptom-free.

Occasionally one is confronted with a child less than 3 years old with very definite spasmodic asthma, but on the whole it is the eczematous baby that is the potential asthmatic of the future. Can we, by treating the allergic state in the infant prevent, wholly or in part, the development of asthma at a later date? By the age of 6 many children are already missing weeks or even months of schooling each year owing to asthma. In a survey carried out during the war years on a number of children from the Oxford elementary schools, tested and treated for their asthma between the ages of 6 and 10 years, it was found possible to get an almost asthma-free population in the secondary schools (aged 12-15), and in my opinion it is the duty of every parent, every family doctor and specialist, to cooperate in every way to enable this handicapped child to overcome his allergic state before he reaches the more competitive age of schooling; for, as soon as he realizes that owing to

some inborn disability he cannot compete with his colleagues in sport and enjoy all the fun of life to the full, a gradual neurosis overtakes him. If for some unfortunate reason he has not been treated at a younger age, he will need prolonged help from his medical advisor or a specialist in psychology before he faces the world squarely again.

A boy in his teens is usually brought to see me by one or both of his parents, and the first step towards giving him confidence in handling his own abnormality, which should be treated as a temporary disability rather than an illness, is to see him alone, let him give his own history, and hear how his troubles affect him. Then he is tested with a full range of inhalants with which he may have contact, pollens of plants growing in his district or country, and foods which he eats regularly. These all give the immediate or extracellular type of reaction within 10 minutes and, if positive, are playing some part in spasmodic attacks of asthma. If, however, these tests are all negative and from the history one suspects the gradual onset of long bouts of asthma, then tests must be done with common bacterial proteins and common household and atmospheric moulds. Occasionally these give an immediate response, but the site of the tests should be examined after 24 hours, for bacterial allergy is often of the *delayed intracellular* rather than the *immediate extracellular* type. Children from 12 to 16 should themselves be made responsible for avoiding any foods or animals to which they have given a positive test, and encouraged in every way to co-operate with their medical advisers. Most parents are only too pleased to agree to this, but a few will continue to 'fuss' over every suspected wheeze.

OBSCURE ALLERGIES

In contrast to the obvious allergic manifestations, there are many conditions in which allergy is only one of a number of causes to be considered in the differential diagnosis. Foremost among these is a syndrome of poor appetite, marked underweight for age, and lack of 'pep' sometimes, but by no means always, associated with a spotty skin. These children may be and often are allergic to some common food, which can be avoided in the diet, and no other treatment is required; occasionally the same syndrome presents as a seasonal trouble, usually in the spring or summer and is really just one more possible way of showing pollen sensitivity. A common fallacy with doctors as well as parents is to expect pollen sensitivity to show always as the classical hay-fever with rhinitis and conjunctivitis, but this is far from the truth. During the summer of 1955 in Oxford, cases at the Clinic showed pollen allergy manifesting as:

1. Rhinitis and conjunctivitis (2-16 years)
2. Conjunctivitis only, with no nasal symptoms whatever (4-16 years)
3. Asthma with rhinitis
4. Asthma with conjunctivitis.
5. Asthma, without any nasal or ocular signs
6. Weeping eczema (aged 3) from 8 June until controlled with antihistamines on 10 July; after 20 July no antihistamines needed.
7. Vomiting and diarrhoea in a child of 5 from 8 June to 20 July
8. Mucous colitis in a boy of 15 from 8 June until 31 July
9. Scleritis and episcleritis without rhinitis (aged 6 years)
10. Iritis without conjunctivitis (aged 8 years)
11. Headaches with occasional *petit mal* between 4 June and 20 July 1955 (aged 5 years). Mother reported same symptoms in June and July last year).

Other examples of obscure allergies are shown in the cases 8-11:

Case 8. J.C., male (7 years). Frequent left supra-orbital headaches with visual disturbances and vertigo during last 2 years. Grandmother had migraine, mother has rheumatoid arthritis. Allergy tests (14 December 1954): *Beef* ++, *mutton* ++, *pork* +. Avoided meats for 2 months and remained symptom-free. 12 February 1955, desensitization by injection begun (6 weeks). 9 August 1955, has been eating meat since March, still symptom-free.

Case 9. P.B., male (9 years). Chronic 'sticky' conjunctivitis each summer since 3 years old. Periodic deafness, worse in summer since otitis media when 4 years old. Skin irritation each June and July since age of 7. Conjunctival swab—*Staph. aureus* sensitive to penicillin. After treatment with penicillin in March 1954 all symptoms disappeared until 1 June 1955, when irritation of skin appeared. 4 June 1955, conjunctivitis. 6 June 1955, deafness. Allergy tests: *Grasses* ++, *house dust* ++, *fish* ++.

Case 10. S.R., female (10 years). 'Gritty' eyes and some stickiness for 6 months. 11 July 1955, conjunctival swab negative. Allergy tests: *Horsehair* +++, *feathers* +++. Had been sleeping on feathers and had a pet bird. These avoided for 1 month. 9 August 1955, reported symptom-free since 14 July 1955.

Case 11. R.C. (4 years). Folliculosis of conjunctiva June 1954 and June 1955. No infantile eczema; no true hay-fever of eyes and nose. Mother had migraine, uncle had corneal ulcers. Allergy tests, prick method (21 June 1955): *Cocksfoot grass* +++, *rye grass* ++, *Timothy grass* ++. Antistin-privine eye-drops and Benadryl elixir given: clear in 2 weeks.

Now that rheumatologists and allergists are agreed that allergy plays some part in rheumatic fever and a large part in the aetiology and treatment of gout and of rheumatoid arthritis, we must realize that swollen joints of children's diseases may be, but are not necessarily, due to an allergic response to an endogenous virus, or may be imitating the hydrarthrosis of adults caused by exogenous factors such as inhalants and foods. This year Lewis (1955) has published evidence supporting a close relationship between Schonlein-Henoch purpura, acute haemorrhagic glomerulo-nephritis and acute rheumatism, and considers hypersensitivity to be a major aetiological factor in all three conditions.

MANAGEMENT OF THE ALLERGIC CHILD

This must be considered under two headings: (1) during an allergic attack, and (2) during other illnesses.

During an allergic attack, whether of the short sharp type, as in spasmodic asthma, or of the prolonged type, as in chronic eczema, every effort must be made to shorten the attack and so prevent permanent tissue-damage. The use of antihistamines during the last 10 years has helped those suffering from eczema, hay-fever, oedema of sinuses or of joints, to control the acute stage until investigation for the offending allergens can be completed, though it is generally agreed even by the manufacturers that antihistamines do not relieve the asthmatic. It is possible and desirable to give a small dose of adrenaline by injection to babies from 3 months of age to control true asthma but 6 minims of 1/2000 adrenaline for a baby of under 1 year is probably more than enough. If adrenaline be given *slowly*, at the rate of 1 minim per minute, there is no danger of shock;

but 1/4 tablet of neo-epinine under the tongue is often easier for the doctor than a 6-minute injection.

In all allergic conditions the primary aim must be to find the cause of the attack. Skin tests have a useful place in our scheme, though they are not infallible. It is difficult to assess the result unless one knows from much practice the capabilities of one's solutions and does adequate controls. Experience is really the best guide. Far too many doctors have ordered a few vials of testing solutions, of doubtful age and origin, from some commercial firm and found that every test gave a positive reaction or every one gave a negative, and so condemned skin tests as useless. One gains confidence in one's technique only when the results obtained can be repeatedly confirmed by clinical trial. Even then, such results must be assessed together with the history and the development of the allergic condition and with any other positive findings on thorough examination of the patient. For comparison one should remember that although only one doctor in 100 is capable of taking and reading an X-ray plate, the other 99 do not condemn radiology.

It is all-important to realize that every child in an allergic state may have a general reaction to any new drug; so it becomes necessary to carry out preliminary intradermal tests before a full dose is given, care being taken not to obscure the result by an earlier dose of antihistamine. Antibiotics should be avoided wherever possible since they often act as sensitizers, turning any minor allergy present into a major one and so producing unexpected complications in a child who is already ill. In very severe illness, when some antibiotic is really necessary to save life, yet a preliminary test shows an allergy to the drug, it is wise to give some antihistamine by injection immediately before each dose of the antibiotic, but the careful balancing of the inter-reactions of the two injections must be considered by the doctor in charge every few hours, for it is quite impossible to write up any pre-arranged dosage charts since the requirements of any two patients are never exactly similar.

Some children, though very few, should have tonsils and adenoids removed, but our allergic child is very seldom among this list. Wet, boggy, pale nasal mucous membranes, oedematous adenoidal tissue, enlarged but non-septic tonsils, are never successfully treated by surgery. The offending allergen is usually an inhalant dust or pollen, but not always, for a common food (milk, wheat, fish, etc.) was the main cause of chronic non-seasonal nasal catarrh in 23 out of a recent series of 60 school-children between the ages of 6 and 12 years. In each case the results of skin-testing were confirmed by avoidance of the suspected foods for 3 months before any treatment by desensitizing injections was ordered. Allergy, if under control, need never be a contra-indication to tonsillectomy where this is obviously necessary to avoid frequent bouts of tonsillitis or mechanical interference with speech or breathing. Similarly, our allergic child need not be denied vaccination against small-pox or immunization against diphtheria or yellow-fever, provided these are undertaken only after tests with horse serum, egg white or other substrate used in the preparation of the immunizing fluids.

In conclusion, one would like to predict that in the near future not only every paediatrician but every doctor, will have been introduced to the study of allergy in the clinical pathology department of his medical school, for surely allergy is nothing more nor less than abnormal physiology; and that he will appreciate the interdependence of allergy and psychology in his training in children's wards and out-patient departments.

SUMMARY

After a brief summary of the recent literature on the inheritance of an allergic diathesis, a preliminary report of an experiment to prevent the development of inherited allergic manifestations in the newborn is presented. This is followed by an account of results of 15 years' work with children from 0 to 16 years. Allergies are divided into groups: (1) *obvious*, such as eczema, asthma, urticaria or conjunctivitis, and (2) *obscure*, such as chronic indigestion, cyclic vomiting, migraine, mucous colitis, acidosis, convulsions, or *petit mal*; and it is shown that no child is too young to be investigated and, if found allergic to some common food or inhalant, told how to avoid it. From the age of 7 years onwards every child is encouraged to understand the stresses and strains of everyday life, especially as they influence his own disability. He himself as well as his parents must realize how the psychosomatic nature of his attacks increases with his years and will change, for better or for worse, with the approach of adolescence. It should be the aim of every paediatrician, who must be in part a psychologist and in part an allergist, to overcome during the childhood of his patients any allergic condition of whatever degree, and so be able to consent to the vaccination of an eczematous baby, to immunization against diphtheria and other killing infections, or to the removal of infected tonsils where necessary; and also to reassure the parents that the later development of alternating allergies is no longer a potential shadow over his approaching adult life.

The management of an allergic child in health and disease is discussed with special reports on the influence of sensitizers, such as the antibiotics.

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