the average age of the patients in the various groups is, somewhat to our surprise, almost identical: conservative mastoids, 23 years old; modified radicals, 25½ years; radicals, 24 years.

Summary

A survey is given of cases operated on for chronic otorrhoea during the past year.

The results of the various operations are examined.

Indications for the choice of each method are discussed.

ASSOCIATION OF STAMMERING AND THE ALLERGIC DIATHESIS

BY

A. M. KENNEDY, M.D., F.R.C.P.

*Professor of Medicine in the University of Wales and Director
of the Medical Unit, School of Medicine, Cardiff*

AND

D. A. WILLIAMS, B.Sc., M.D.

*Deputy Medical Superintendent, Llandough Hospital, Cardiff;
Late Assistant in the Medical Unit, School of
Medicine, Cardiff*

The mechanism of speech is a complicated process in which the diaphragm, the muscles controlling the vocal cords, and those of articulation, as in the palate, tongue, and lips (with the teeth), are mainly concerned. Further, these structures are under the control of the central nervous system, and ideas therein originated are given expression in speech through association fibres, the speech centres, and the centres controlling these peripheral muscles. The uninterrupted flow of speech depends upon the proper functioning and co-ordination of all these structures, central and peripheral. Stammering does not depend upon any gross anatomical defect, but is due, apparently, to some disturbance of this essential co-ordination between the various factors responsible for the production of speech. But what is the underlying cause of this disturbance?

Although usually described as a disorder of speech, stammering is really something more, and certain traits of character may be observed in the stammering child. He is often "nervous" and excitable—sometimes with a tendency to suppressed anxiety—and this mental tension often produces physical tension. A general tendency to excitability and nervousness has been noted in family histories and also a tendency for stammering to run in families, but, notwithstanding a rather unstable and nervous temperament, the stammerer is usually intelligent and has a good brain.

One morning, some months ago, three asthmatics happened to present themselves at this medical unit for interview, one shortly after the other. There would have been nothing remarkable in this but for the extraordinary coincidence that each proved to be a stammerer. The thought immediately occurred to one of us (A. M. K.) of the possible association of stammering with asthma and, having regard to the allergic aetiology of the latter, other allergic manifestations. Recalling some resemblance in certain features of allergic individuals and stammerers, it appeared that an inquiry into the presence or absence of allergic manifestations in the personal history of the stammerer and his family might yield results of some note. Accordingly arrangements were made to examine a con-

secutive series of 100 children who suffered from stammer.

Through the kind offices of Dr. Greenwood Wilson and Dr. Colston Williams (medical officers of health and school medical officers) of the city of Cardiff and county of Glamorgan respectively, we were enabled to examine 100 school children selected by head teachers because they were stammerers. These were children, 5 to 14 years of age, who were attending elementary schools in Cardiff and the neighbouring towns of Penarth, Caerphilly, and Bargoed, and were representative of town, suburban, and industrial areas. The parents or guardians were invited to bring them for special examination. Some children, however, came unaccompanied and, as it was thus impossible to obtain any family or other history, they were discarded. Likewise two adopted children, whose foster parents knew nothing of their family history, were also discarded. Again, in certain cases the speech defect proved to be dependent upon some anatomical fault, such as cleft-palate or hare-lip, and in others the children were mentally retarded and the power of speech was immature. Some exhibited nasal speech or were mere "lispers." None of these was a stammerer, and so all were excluded from the investigation. No other selection was made, and the remainder were examined in rotation until 100 true stammerers had been seen.

Each child was examined personally and the parent or guardian cross-questioned. Careful inquiry was made for any personal or family history of allergy or allergic inheritance, and questions were asked in regard to such allergic manifestations as asthma, eczema, hay-fever, migraine, and urticaria. Caution was often necessary in framing the questions relative to family history, for some parents were inclined to boast that theirs "was always a healthy family" or that "there never was any trouble or disease in our family." Some seemed to think that questions, particularly in regard to skin eruptions—eczema and urticaria—cast rather a reflection on them, whereas most quite freely admitted if there was any incidence of asthma in the family. With tact and patience, however, the family history usually came out clearly and the parent became quite interested. With regard to migraine we accepted as evidence headaches, periodically recurring and severe, principally unilateral or over the temple and throbbing in character, often accompanied by visual disturbances and vomiting, and all against a background of good health.

It was not unusual in such cases to get a history of stomach trouble, sickness, vomiting, or "bilious attacks," without any mention of associated headaches until direct questions were asked. Apart from the question of migraine note was taken of any aversion to or gastro-intestinal upsets following particular foods, or "fastidiousness" regarding food generally, exhibited by the child and suggestive of food allergy. The family history on both paternal and maternal sides was carefully sifted, and at the same time the opportunity was taken of noting whether there was any family history of stammering and whether the child was right- or left-handed.

Of the 100 children examined eighty-one were boys and nineteen girls; eighty-nine proved to be right-handed and eleven left-handed; and a family history of stammer was present in sixty-five cases and absent in thirty-five.

Incidence and Nature of Allergy Present

I.—CHILDREN WITH A PERSONAL HISTORY OF ALLERGY (52 CASES)

(a) Fifty-two children gave a *personal* history of allergic manifestations, as shown in the following table:

										Children Affected
Migraine	..	..	..	..	..	..	..	..	..	19
"	+	urticaria	..	..	..	..	..	..	..	8
"	+	"	+	asthma	..	..	..	..	..	1
"	+	asthma	..	..	..	..	..	..	..	3
"	+	"	+	eczema	..	..	..	..	..	1
										32
Urticaria	..	..	..	..	..	..	..	..	..	11
Asthma	..	..	..	..	..	..	..	..	..	4
"	+	eczema	..	..	..	..	..	..	..	2
"	+	hay-fever	..	..	..	..	..	..	..	1
"	+	"	+	eczema	..	..	..	..	..	1
										8
Eczema	..	..	..	..	..	..	..	..	..	1
										52

(b) Thirty of these fifty-two children also gave a history of "fastidiousness" in regard to food generally, dislikes or refusals of, or gastro-intestinal upsets after, particular foods.

(c) Of these fifty-two children with a *personal* history of allergy forty-eight *also* had a *family* history of allergy.

The *family* history of allergy was

										Cases
On the maternal side in	..	..	..	..	..	..	..	..	..	25
" " paternal	"	"	"	"	"	"	"	"	"	10
" both maternal and paternal sides in	..	..	..	..	..	..	..	..	..	12
In another member of the family only (sister) in	..	..	..	..	..	..	..	..	..	1

The allergic manifestations in the *families* of these forty-eight children are tabulated below:

										Families Affected
Migraine	..	..	..	..	..	..	..	..	..	8
"	+	asthma	..	..	..	..	..	..	..	9
"	+	urticaria	..	..	..	..	..	..	..	2
"	+	"	+	asthma	..	..	..	..	..	3
"	+	"	+	hay-fever	..	..	..	..	..	2
"	+	"	+	"	+	asthma	..	..	..	1
"	+	"	+	"	+	eczema	..	..	..	1
"	+	asthma	+	eczema	..	..	..	..	..	1
"	+	"	+	hay-fever	..	..	..	..	..	3
"	+	eczema	..	..	..	..	..	..	..	1
										31
Urticaria	..	..	..	..	..	..	..	..	..	1
Asthma	..	..	..	..	..	..	..	..	..	10
"	+	urticaria	..	..	..	..	..	..	..	2
"	+	"	+	hay-fever	+	eczema	..	..	..	1
										13
Hay-fever	..	..	..	..	..	..	..	..	..	2
Eczema	..	..	..	..	..	..	..	..	..	1
										48

(d) The closeness of the allergic inheritance of these forty-eight children may be observed by noting in each case the *nearest* relation who suffered from allergic manifestations.

In 20 cases the mother suffered	In 6 cases a grandparent suffered
" 9 " " father	" 4 " an aunt suffered
" 8 " both parents suffered	" 1 case a sister

Thus it will be seen that in thirty-seven cases one or both parents exhibited allergic manifestations and in six a grandparent was the nearest sufferer. An aunt was the nearest relative in four cases, and in one case the allergic symptoms were observed in a sister of the child.

(e) Thirty-three of the fifty-two children (including the four with no allergic *family* history) had a *family* history of stammer. The closeness of the stammering inheritance was as follows:

			Cases				Cases
Father stammered..	..	..	13	Cousin stammered	..	..	3
Mother " " "	..	..	4	Brother and sister stammered	..	..	1
Grandparent stammered	..	..	2	Great-uncle stammered	..	..	1
Uncle or aunt " "	..	..	9				

(Where brothers or sisters stammered they have been omitted, except in one instance where no other near relation with stammer was discovered.)

(f) Seven of the fifty-two children were left-handed; six of these seven had a family history of allergy and two also a family history of stammer.

II.—CHILDREN WITH NO PERSONAL HISTORY OF ALLERGY

(a) Forty-eight children gave *no personal* history of allergic manifestations, but a *family* history was obtained in *all* except one. Fifteen of these children, however, gave a history of "fastidiousness" in regard to food generally, dislikes or refusals of, or gastro-intestinal upsets after, particular foods.

The *family* history of allergy was

										Cases
On the maternal side in	..	..	..	..	..	..	..	..	..	27
" " paternal	"	"	"	"	"	"	"	"	"	14
" both maternal and paternal sides in	..	..	..	..	..	..	..	..	..	3
In another member of the family only (sister) in	..	..	..	..	..	..	..	..	..	3

The allergic manifestations in the *families* of these forty-seven children are shown in the following table:

										Families Affected
Migraine	..	..	..	..	..	..	..	..	..	24
"	+	asthma	..	..	..	..	..	..	..	7
"	+	"	+	hay-fever	..	..	..	..	..	2
										33
Urticaria	..	..	..	..	..	..	..	..	..	1
Asthma	..	..	..	..	..	..	..	..	..	9
"	+	urticaria	..	..	..	..	..	..	..	1
"	+	hay-fever	..	..	..	..	..	..	..	2
"	+	eczema	..	..	..	..	..	..	..	1
										13
										47

(b) The closeness of the allergic inheritance, or nearest relative who suffered from allergic manifestations, in the families of these forty-seven children was as follows:

In 26 cases the mother suffered	In 5 cases a grandparent suffered
" 10 " " father	" 2 " an aunt
" 1 case mother and father	" 3 " a sister

Thus one or both parents suffered in thirty-seven cases, in five cases a grandparent, in two an aunt, and in three a sister.

(c) Thirty-two of the forty-eight children (including the one with no allergic *family* history) had a *family* history of stammer. The closeness of the stammering inheritance was as follows:

Cases						Cases					
Father stammered	..	..	..	..	14	Cousin stammered	..	..	..	2	
Mother	"	..	..	..	4	Brother or sister stammered	..	..	..	2	
Mother and father stammered	..	..	..	..	2	Great-uncle	"	..	..	1	
Grandparent stammered	..	..	..	..	1	First cousin once removed	..	..	..	1	
Uncle or aunt	"	..	..	..	5	stammered	..	..	..	1	

(Where brothers or sisters stammered they have been omitted, except in the two instances where no other near relation with stammer was discovered.)

(d) Four of the forty-eight children were left-handed and all had an allergic family history. Three also had a family history of stammer.

III.—A SERIES OF CHILDREN EXAMINED WITHOUT REFERENCE TO STAMMERING

By way of comparison reference may be made to an investigation, recently completed by one of us (D. A. W.), in which 1,000 elementary school children in Cardiff were examined in a similar manner. This had nothing to do with stammering, but was undertaken in connexion with the "milk-in-schools" scheme, to discover whether there were any allergic manifestations of any kind (not necessarily to milk) in the personal or family histories. The results are tabulated below:

(a) 500 children taking milk at school:		%
Personal history only of allergic manifestations	..	1.2
" + family history of "	..	9.6
Family history only of "	..	23.0
(b) 500 children <i>not</i> taking milk at school:		
Personal history only of allergic manifestations	..	2.0
" + family history of "	..	9.0
Family history only of "	..	33.2

Discussion

While hypersensitiveness in the human subject may occasionally be acquired, the importance of the hereditary factor in allergic conditions is now generally accepted. In a few cases the particular type of allergy appears to be inherited; more often, however, specific sensitivity is not inherited, but the tendency to become sensitive is transmitted from one generation to another. It is not necessarily the disease, such as asthma or urticaria, which is inherited, but the constitutional make-up or allergic diathesis which predisposes descendants to the development of sensitiveness. They do not of necessity suffer from the same type of allergic manifestation as their forebears, but they may become sensitive to any allergic agent with which they come into adequate contact at any time from birth onwards. The allergic individual is one who is constitutionally susceptible.

The predisposition is localized, as a rule, in some particular group of cells in special tissues or organs of the body, but an allergic reaction does not occur until the specific allergen to which the patient is sensitive comes into adequate contact with them. The variability of the allergic symptoms is due to the fact that the location of the groups of potentially sensitive cells is not constant.

Vasomotor reactions in the tissues, transitory and reversible, are the principal local features of the allergic response in the human being—first vascular spasm, then capillary dilatation and increased permeability resulting in an exudation of oedematous fluid and cellular infiltration, chiefly eosinophils—and so it has been suggested that allergic individuals inherit an unstable vasomotor system. But vasomotor irritability—seen particularly in urticaria and angioneurotic oedema—is probably part of the constitutional “make-up” of allergic subjects, and is an accompaniment, but not the primary cause, of the allergic state. Vasomotor instability occurs in other conditions, but when it is present in individuals with the allergic diathesis or inherited predisposition to become sensitive to allergens it probably plays some part in the production of symptoms.

As previously noted, a general tendency to excitability and nervousness often runs in the families of stammerers. The stammerer himself is apt to be “nervous” and excitable, and his mental tension—suppressed anxiety—often causes physical tension. Fear, anxiety, and other emotions generally cause an aggravation of his stammer. Nervous, emotional, or psychical stimuli have also considerable influence in allergic conditions; and in asthma, for example, it has been suggested that psychological factors, such as fear, anxiety, anger, and similar emotions, may precipitate an attack. It would appear, however, that such agents are of little importance in the absence of the allergic predisposition, but in individuals already so predisposed emotional disturbances may act as aggravating factors and possibly precipitate a reaction.

Nervous and emotional disturbances are not the cause of the allergic state, but may accompany or result from it, and consequently allergic individuals may be specially alert and active mentally. Stammerers also, it may be recalled, are usually intelligent and have good brains, notwithstanding their rather unstable and nervous temperaments. The close connexion of the nervous and vascular systems (Forbes and Cobb, 1938) provides the path through which the latter may be influenced by fear, anxiety, anger, and other emotional and nervous disturbances.

In allergic migraine the hereditary factor is particularly strong, and the exciting factor is usually a food allergen. Here it may be recalled that sixty-five of the 100 stammering children investigated gave a *family* history of migraine and thirty-two a *personal* history of it. Incidentally, forty-five had a *personal* history of “fastidiousness” in regard to food generally, refusals or dislikes of, or upsets after, certain foods. The particular type of cerebral disturbance responsible for the headaches and other manifestations is thought to be a local allergic reaction producing temporary oedema of the meninges, cortex, or other parts of the brain, with, possibly, vascular spasm. Goltman's (1936) study of a typical case of allergic migraine in which he had the opportunity of making direct observations through an opening in the skull strongly supports this view. Such a mechanism could explain the various transient phenomena of typical migraine, such as visual disturbances, giddiness, paraesthesias, disturbances of speech, twitchings, and local paresis. The sickness and vomiting might also have a similar central origin. The transient disturbance of speech, at times amounting almost to aphasia, which is occasionally an accompaniment of the migrainous seizure, is of special significance in view of the findings in the present investigation into stammering. The observations of Foster Kennedy (1926) on focal cerebral oedema as a cause of cerebral symptoms in angioneurotic oedema also lend support to this view. Reference to the figures given above show that a *personal* history of urticarial attacks was obtained in twenty of the 100 stammering children investigated. In fact, either migraine or urticaria, alone or in combination, and with or without some other allergic manifestation, was present in the *family* histories of seventy children and in the *personal* histories of forty-three.

In view of the close and practically constant association of stammering and allergic manifestations in the personal and family histories of the stammerer, as revealed by the present investigation, it is difficult not to conclude that there is something more in it than a mere casual relationship between stammering and the allergic diathesis. It is not suggested that stammering is the direct result of an allergic reaction; but, considering the high incidence of allergic manifestations in our series of stammerers and accepting the view that the local tissue response in allergy is a vascular one—spasm followed by capillary dilatation and oedematous exudation, transitory and reversible—we may assume the existence of a cerebral cortex which is hypersensitive to any transient vasomotor disturbance brought about not by a specific allergen but by the effort of speech. In any case the findings are suggestive that an attempt to influence the sensitive constitution of the stammerer might at least be worth a trial. The frequency of migraine and “fastidiousness” in regard to food generally which we encountered, and the fact that a food allergen is usually the exciting factor in migraine, suggest that a beginning might be made with special allergic or elimination diets. Even ephedrine might have a place in treatment. But all this is a matter for further study.

Summary and Conclusions

A consecutive series of 100 children who suffered from stammer was examined with a view to discovering the association, if any, between stammering and the allergic diathesis. The personal and family histories of each child were carefully sifted for any evidence of allergic manifestations.

In all cases, except one, positive evidence of allergy was found in the personal or family history. Fifty-two

gave a positive *personal* history, and forty-eight of these also had a positive *family* history. Forty-eight gave *no personal* history, but a positive *family* history was obtained in all of them except one.

The various allergic manifestations in the personal and family histories have been tabulated and the closeness of the allergic inheritance noted.

A family history of stammer was obtained in sixty-five of the 100 cases, and the closeness of the stammering inheritance has been noted.

Stammering tends to run in families. The hereditary factor plays an important part also in the allergic diathesis—the constitutional “make-up” which is apt to become sensitive being transmitted from one generation to another. A general tendency to excitability and nervousness frequently runs in the families of stammerers, who themselves are often “nervous” and excitable and whose mental tension—suppressed anxiety—often causes physical tension; such emotions generally aggravate the stammer. Nervous, emotional, and psychical stimuli have also an influence in allergic conditions, and it has been suggested that, in asthma, certain emotions—fear, anxiety, etc.—may precipitate an attack. These, however, appear to be mere aggravating factors, and are of importance only in the presence of the allergic predisposition of which they are a frequent accompaniment or a result. The vascular system through its close connexion with the nervous system may be influenced by fear, anxiety, anger, and other emotions, in stammer and also in allergy.

Notwithstanding their nervous and rather unstable temperament, stammerers are usually intelligent and have good brains. Allergic individuals also—for example, sufferers from migraine—are often very alert and active mentally.

In allergic migraine the hereditary factor is particularly strong and the exciting factor usually a food allergen. Sixty-five of the 100 stammering children gave a family history of migraine and thirty-two a personal history of it. Forty-five had a personal history of “fastidiousness” towards food generally or upsets after particular foods.

The close and practically constant association of stammering and allergic manifestations in the personal and family histories of the stammerer, as revealed by the present investigation, rather favours the view that there is something more than a mere casual relationship between stammering and the allergic diathesis.

REFERENCES

- Forbes, H. S., and Cobb, S. S. (1938). *Brain*, 61, 221.
Goltman, A. M. (1936). *J. Allergy*, 7, 351.
Kennedy, F. (1926). *Arch. Neurol. Psychiat.*, Chicago, 15, 28.

R. Cento (*Minerva med.*, 1938, 29, 235) records his observations on ten patients with ulcerative tuberculous lesions and purulent sputum containing a large number of bacilli who were treated for thirty consecutive days by intravenous injections of 2 c.cm. of beeswax dissolved in 5 per cent. of olive oil and 10 per cent. of cod-liver oil, combined with calcium by mouth or intravenously. In all the patients after the first ten injections there was a diminution in the quantity of sputum, which subsequently became less purulent; finally there was only a little morning expectoration. In all the ten cases after the first ten to fifteen injections there was a diminution in the number of tubercle bacilli, which assumed a granular appearance and became no longer acid-fast. At the end of treatment four patients became sputum-negative, and in two others it was possible to find only a few acid-fast bacillary forms on examination of the gastric juice. Inoculation of numerous specimens of this sputum on Petraghani tubes produced a macroscopic growth in only two cases.

THREE CASES OF INTUSSUSCEPTION IN THE ADULT

WITH REFERENCE TO AETIOLOGY

BY

C. L. HEANLEY, F.R.C.S., M.R.C.P.

Surgical First Assistant and Surgical Registrar, London Hospital

Acute intussusception in the adult is rare, and then usually occurs in connexion with “tumours” of the intestinal wall (Fiske, 1937; Goodall, 1910); but this is not an essential factor (Bryan, 1937), for in Case III, so far as could be found, no initial cause was present. Several cases have been reported in which the causal tumour was discovered only at subsequent operations (Oughterson and Cheever, 1929). In infants so-called primary intussusception is said to arise in connexion with inflammatory changes in the lymphoid tissue in the mucosa of the lower end of the small intestine (Perrin and Lindsay, 1921). This lymphoid tissue swells, and forms as it were a “tumour.” The accompanying illustration shows this

Specimen taken from a fatal case of intussusception in an infant. The caecum and lower few inches of ileum have been opened from behind, and a sessile tumour-like mass of lymphoid tissue is seen about three inches from the ileo-caecal valve. This formed the apex of the intussusception.

“tumour” formation very well. At operation in infants almost invariably the lymph glands in the mesentery are also enlarged, a change not found in these three cases. That so-called primary intussusception does not occur so commonly in the adult is said to be due to the fact that lymphoid tissue becomes reduced with age, as is well seen in the pharyngeal and palatine tonsil areas, and also because the lumen of the intestine is relatively larger in the adult.

Intussusception differs from other forms of intestinal obstruction in the fact that the patient usually passes stool, as is well shown here. In infants the stool often contains blood and mucus, but in these cases no blood was noticed.

Case I

In December, 1937, a woman aged 47 was admitted to hospital complaining of ten days' intermittent abdominal pain. Her history contained nothing of note save an attack of abdominal colic one year previously, that lasted a few hours only.

Ten days before admission there was an onset of mild generalized abdominal pain not associated with vomiting. Seven days before admission the pains became more severe, and were