and the response to vitamin B₁₂ still need to be investigated. May *et al.* (1950) have suggested that vitamin-C deficiency plays a large part in this disease, but we think this unlikely, as scurvy is very rare in our wards. Zuelzer and Rutzky (1953) state that vitamin C is not specific and that its lack does not prevent the action of folic acid. They further state that all cases invariably responded to folic acid. We agree with this generalization because the "megaloblastosis" of the bone marrow disappears quickly, and have gained the impression that responses are more rapid if treatment includes intramuscular folic acid.

Summary

Forty-two cases of megaloblastic anaemia in infancy (5.4% of all admissions) diagnosed during a year by bone-marrow examinations are described.

Twenty-two cases suffered from kwashiorkor, the remainder from various infections.

The clinical picture and the criteria for bone-marrow diagnosis are described.

The results of treatment with folic acid are reported.

The mortality rate was 24%, but in all but one case these deaths were thought to be due to the primary disease or some acute complication.

Megaloblastic anaemia of infancy is thought to be a secondary disease; the megaloblastosis of the bone marrow can be cured by giving folic acid, which is specific.

We can only speculate on the reasons for now finding this disorder, when five years ago a similar search was unrewarding.

Our thanks are due to Dr. A. B. Taylor, medical superintendent, McCord Zulu Hospital, for unstinting help; to Dr. J. C. Thomas, provincial pathologist, Natal Provincial Administration, for laboratory facilities; to Mrs. A. H. Schriever for active technical assistance; and to Professor J. F. Brock, professor of medicine, University of Capetown, for helpful criticism. We are indebted to Dr. P. Naidoo, senior resident medical officer, for supervision of some of the patients and much clerical work; to the numerous resident medical officers who helped in the care of these patients; and to Sister Edith Koko, sister in charge of the paediatric wards, for her unflinching attention. The folic acid used as "folvite" was generously supplied by Lederle Laboratories Division, American Cyanamid Company.

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According to a correspondent in the *Journal of the American Medical Association* (February 4, 1956, p. 415) the Navajo Indians are the sickest group of people in the United States and have the least medical care. Life expectancy among the Indians is 20 years, and one baby out of every four dies before the age of 5. Two dispensaries are provided on the Navajo reservation by Catholic Indian missions; trained nurses are in charge. One of these dispensaries is 100 miles from the nearest hospital, doctor, or drug store.

RESPIRATORY VIRUS INFECTIONS IN R.A.F., 1954-5

WITH PARTICULAR REFERENCE TO INFLUENZA AND A.P.C. VIRUSES

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Acute respiratory disease is of considerable importance in the Royal Air Force, in particular because of its effects on the efficiency of aircrew. As good opportunities exist in the Service for the investigation of this problem, a survey was made during the winter of 1954-5.

The main objects of the survey were (1) to observe the prevalence of identifiable respiratory virus infections in selected units, and to see whether evidence could be found of illness associated with infection by the adenoidal-pharyngeal-conjunctival (A.P.C.) group of viruses; and (2) to study the relationship between the level of circulating antibody to soluble antigen and susceptibility to influenza.

Viruses of the A.P.C. group were first isolated by Rowe *et al.* (1953), and further reports on the group were made by Huebner *et al.* (1954) and Rowe *et al.* (1955). Hilleman and Werner (1954) reported the cultivation of an agent designated R1-67, and subsequently shown to be one of the A.P.C. group, from patients with acute respiratory illness. The outbreak in which these cases occurred was at Fort Leonard Wood, Missouri, and was later described in detail (Hilleman *et al.*, 1955a). Hilleman *et al.* (1955b) have since reported upon the high prevalence of infection with viruses of this family among recruits in Fort Dix, New Jersey, and Berge *et al.* (1955) among recruits in Fort Ord, California. Serological evidence of infection associated with respiratory illnesses in northern England has recently been reported by Zaiman *et al.* (1955). In October, 1954, before the beginning of the present study, we investigated a small outbreak of respiratory illness in an R.A.F. unit in Kirkham (Lancs), and found a fourfold or greater rise in complement-fixing antibody to an A.P.C. antigen (R1-67) in three patients with influenza-like symptoms: a virus strain of the A.P.C. group was isolated from throat washings from one.

The survey described here lasted four months—from the beginning of December, 1954, to the end of March, 1955. Special studies were made at 10 selected units scattered throughout England. These were Chivenor (Devon), Driffield (Yorks), Horsham St. Faith (Norfolk), Middleton St. George (Durham), Middle Wallop (Hants), Newton (Notts), North Weald (Essex), Stafford (Staffs), Syerston (Notts), and Warton (Lancs). In one of the 10 stations evidence was found of an outbreak of acute respiratory illness associated with A.P.C. virus infection. This outbreak occurred in March, 1955, soon after an outbreak of influenza B in the same unit, and was

accompanied by some cases of influenza A. Influenza B was prevalent in all 10 units during the survey, but only in five was it possible to study the relationship between antibody and susceptibility to infection.

Materials and Methods

Collection of Specimens and Clinical Records

Much of the task of making clinical records and taking specimens fell upon the unit medical officers in the 10 stations. From December 1, 1954, to March 31, 1955, they were responsible for keeping a standard record of every case of acute respiratory illness admitted to sick quarters for over 48 hours. In addition they found approximately 100 volunteers in each unit, from each of whom a sample of blood was taken in mid-December, 1954; a second specimen was obtained from the majority early in March, 1955. Altogether, 1,001 persons were bled in December and 711 of these again in March. Most of those not bled a second time had been posted to other units or discharged from the Service. The extent to which the 711 volunteers were representative of their units is not known, but it seems probable that the incidence of acute respiratory infections among them provided a useful indication of the experience of the whole unit.

In the event of a marked increase in respiratory illness in a unit, or in any part of it, it was planned to take throat washings for virus isolation and paired blood specimens from about six typical cases for laboratory examination. Difficulty was, however, experienced by medical officers in deciding whether an observed increase in illness was sufficient to warrant the taking of specimens; as a result a number of outbreaks occurred from which no specimens were available. Nevertheless, specimens were obtained from outbreaks in 6 of the 10 stations during the four-months period; and in one—Stafford—evidence of infection with the A.P.C. virus group led to further and more detailed investigation.

Specimens of blood were taken in sterile evacuated tubes having a needle attached ("venules"), and were sent to the laboratory by post. Serum after separation was stored at -30°C . Throat washings were obtained by asking the patient to gargle with 10 ml. of sterile saline. The washings were collected in screw-capped glass containers and approximately 3 ml. of nutrient broth was added. These specimens were frozen over solid carbon dioxide for transport to the laboratory and stored there at -70°C . in an electric refrigerator till they could be examined.

Complement-fixation Tests

Influenza virus A, B, and C antigens were prepared from infected hen eggs. The A and B antigens were chloroform-treated extracts of chorio-allantoic membrane, whereas the C antigen consisted of untreated amniotic fluid. The A.P.C. virus group antigen was prepared from HeLa cell cultures infected with the R1-67 strain of virus.* Cultures of HeLa cells showing complete cellular degeneration were frozen at -30°C . with the medium still present. Next day the medium was thawed and centrifuged at low speed to remove cellular debris, and the supernatant fluid heated at 56°C . for 30 minutes. This fluid was stored at 4°C . and used as antigen without further treatment.

Complement-fixation tests for influenza A, B, and C were performed in "perspex" plates of the type used for haemagglutination tests (W.H.O., 1953). Equal volumes (0.1 ml.) of serum dilution, complement ($2\frac{1}{2}$ M.H.D.), and antigen in optimal dilution were mixed and incubated at 37°C . for 75 minutes; 0.2 ml. of a 1% suspension of sensitized sheep red blood cells was then added. After a further 30 minutes at 37°C . the tests were left at 4°C . overnight before being

read. The highest initial dilution of serum showing at least 75% of red cells unlysed was recorded as the titre of that specimen.

Complement-fixation tests for the A.P.C. virus group were performed on flat sheets of perspex by a method derived from that of Belyavin (1953). Equal volumes (0.02 ml.) of serum dilution, complement ($2\frac{1}{2}$ M.H.D.), and antigen in optimal dilution were mixed and then put in a humidified box at 37°C . After incubation for 75 minutes 0.02 ml. of a 0.5% suspension of sensitized sheep red blood cells was added. After a further 30 minutes at 37°C . the tests were read. The highest initial dilution of serum showing more than half the red blood cells unlysed was recorded as the titre of that specimen.

Virus Isolation Tests

Influenza virus isolation tests were performed by the amniotic inoculation of fertile hen eggs on the tenth day of incubation. Virus isolations were confirmed by complement-fixation tests. A.P.C. virus was isolated by inoculation of roller-tube cultures of HeLa cells and its presence confirmed by complement-fixation tests, using the culture fluids as antigen against a known positive pool of human serum.

Results

(a) Prevalence of Respiratory Virus Infections

The admission rate for respiratory illness in each unit and the serological findings on the blood taken from volunteers are summarized in Table I. The average admission rate for

TABLE I.—Summary of Main Findings in the 10 R.A.F. Stations

R.A.F. Unit	Respiratory Illness Admission Rate* Dec., 1954– March, 1955	No. of Volunteers Bled		No. Showing Fourfold or Greater Rise in Complement-fixing Antibody to		
		In Dec., 1954	In March, 1955	Influenza Virus A	Influenza Virus B	R1-67 Virus
Chivenor ..	3.6	103	76	0 (—)	17 (22%)	0 (—)
Driffild ..	4.1	56	37	2 (5%)	9 (24%)	0 (—)
Horsham St. Faith	6.4	103	85	0 (—)	14 (17%)	0 (—)
Middleton St. George	4.3	119	95	1 (1%)	8 (8%)	0 (—)
Middle Wallop	5.5	85	54	0 (—)	14 (26%)	0 (—)
Newton ..	5.8	108	69	1 (1%)	3 (4%)	0 (—)
North Weald ..	7.9	104	74	0 (—)	23 (31%)	0 (—)
Stafford ..	10.0	109	68	1 (1%)	29 (43%)	2 (3%)
Syerston ..	6.0	96	74	0 (—)	12 (16%)	0 (—)
Warton ..	6.5	118	79	1 (1%)	5 (6%)	0 (—)
Total	6.9	1,001	711	6 (1%)	134 (19%)	2 (<1%)

* Calculated per 100 of total unit strength.

the 10 units during the period observed was 6.9%, the station with the highest rate being Stafford (10%). Of the 711 volunteers from whom two specimens of blood were obtained, 40 (5.6%) were admitted to sick-quarters with a respiratory illness. Yet a fourfold or greater rise in antibody to influenza virus A was found in 6 (1%) of the 711 volunteers, to influenza virus B in 134 (19%), and to the R1-67 antigen in 2 (<1%). The six virus A infections were divided among five units, and the two A.P.C. infections were both in Stafford. Virus B infections, with infection rates varying from 4% in Newton to 43% in Stafford, were found in all units. No serological evidence of influenza virus C infection was found in any of the volunteers. In five of the units, however, only the sera from those volunteers admitted to sick-quarters with a respiratory illness were examined for antibody to virus C; in the remaining five units all serum pairs were tested. We are indebted to Dr. L. Hatch, of the Virus Reference Laboratory, Colindale, for testing the 711 pairs of sera for evidence of infection with the psittacosis-L.G.V. group of viruses and *R. burneti*. All proved negative, but in tests for *Str. M.G.* agglutination 12 showed a fourfold or greater rise in titre. Only 2 of the 12 were admitted to sick-quarters with a respiratory illness during

*Kindly supplied by Dr. M. R. Hilleman, of the Army Medical Service Graduate School, Washington.

the period, both with symptoms of an influenza-like illness. The sera of one of the two admitted also showed a 32-fold rise in antibody to influenza virus B.

The small number of scattered sporadic cases of virus A infection suggested a low incidence similar to that observed in the civilian population during the same period. The relative predominance of virus B infections was not surprising, since influenza B was prevalent in the country as a whole, but the high proportion infected, particularly in some units, is noteworthy. As already stated, only 40 (5.6%) of the 711 volunteers were admitted to sick-quarters, though 134 (19%) showed serological evidence of infection. Some of those not admitted probably had influenza while on leave or away from their units, but it seems clear that many of the infections were either symptomless or responsible for illness insufficient to require admission. In two units those who had shown serological evidence of infection were interviewed at the end of the survey. Approximately a third had had a typical influenzal illness during the period, a third had had minor respiratory symptoms, and the remaining third maintained that they had had no respiratory illness whatever. Of the 40 volunteers admitted to sick-quarters with a respiratory illness, 15 showed evidence of virus B infection, but since antibody to soluble antigen falls rapidly in convalescence it is probable that examination of serum taken in March failed to detect some infections that occurred early in the observation period. On the other hand, the blood specimens were taken three months apart and not at the time of the illness, so it is possible that in some cases the illness for which they were admitted was not responsible for the serological changes. Though no accurate estimate can be made, it seems reasonable to conclude from findings in the 711 volunteers that about half the admissions to sick-quarters with respiratory illness in the 10 units was due to influenza B.

FIG. 1.—Weekly admissions with respiratory illness per 1,000 total strength in 10 R.A.F. stations (December, 1954, to March, 1955).

The weekly incidence of cases of respiratory illness admitted to sick-quarters in the 10 units is shown in Fig. 1. Results of serological and virus isolation tests on patients admitted indicated that the sharp outbreaks in North Weald and Horsham St. Faith and the lesser outbreaks in Driffield and Middle Wallop were probably due to influenza B. Virus B was also probably responsible for the high rate of respiratory admissions in Stafford in January and February and for outbreaks in Chivenor and Warton, which were waning when the survey began. Middleton St. George and Syerston had comparatively little respiratory illness during the period. Cases of influenza B were confirmed in Newton at the end of November and at the beginning of December but not thereafter; the cause of the increased admission rate in January was not discovered.

(b) Antibody and Susceptibility to Infection

It was reasonably certain that outbreaks of influenza B had occurred during the period of observation and after the December bleeding at North Weald, Horsham St. Faith, Stafford, Middle Wallop, and Driffield. The duration of the epidemics in each of these units was estimated from respiratory illness admission rates and the results of laboratory tests. Of the volunteer blood donors at the five units, 26 were admitted with a respiratory illness during these periods. From the remaining volunteers who had not been admitted at the five units, 78 (i.e., 3×26) were selected at random. Sufficient serum remained from the initial December specimens for further tests on 23 out of 26 of those admitted and 71 out of the 78 not admitted.

These 94 sera were titrated against the influenza virus B soluble antigen, in random order, all on the same day, and without knowledge of the clinical group to which they belonged. The main results are shown in Table II. Of

TABLE II.—Level of Antibody to Influenza Virus B Soluble Antigen in Blood Specimens taken in December, 1954, from Volunteers Subsequently Admitted with a Respiratory Illness and for a Sample of Volunteers not Admitted, in Five Selected Stations

	No.	No. Tested	No. with Antibody Level of 1/2 or Higher	Percentage of those Tested with Level of 1/2 or Higher
Admitted	26	23	4	17
Not "	78	71	42	59

those admitted, 17% had an initial antibody level of 1/2 or more; in contrast, 59% of those not admitted had this level. The difference between these percentages is unlikely to have

been due to chance ($\frac{\text{Difference}}{\text{Standard error}} = \frac{42}{9.8} = 4.3$).

The age distribution in the two groups was similar—87% of those admitted and 80% of those not admitted being under 25 years of age. Seventeen of the 23 admitted were bled again in March, and 11 (65%) of these showed a fourfold or greater rise in antibody to influenza virus B. In addition paired sera taken from two more at the time of illness were positive. Of the 78 not admitted, 61 were bled again in March, and only 14 (23%) of these showed a fourfold or greater rise in antibody to virus B. It seems reasonable to conclude that influenza virus B infection, and illness due to it, were less frequent in those who before exposure had a complement-fixing antibody titre even as low as 1/2.

(c) Outbreak Associated with A.P.C. Virus Infections

When the unit at Stafford was visited in mid-March, 1955, for the purpose of taking second blood specimens from the volunteers originally bled in December it was observed that the admission rate for respiratory illness, which had fallen after the influenza B outbreak in January and February, had risen again (Fig. 1). Most of the cases had influenza-like symptoms. Some convalescent cases were bled and several showed high titres of antibody to the R1-67 complement-fixing antigen. When serum from the 68 volunteers bled in December and March was later tested a fourfold rise in antibody to the same antigen was found in two of them.

Clinical records were obtained for all cases of respiratory illness admitted during March and the first 10 days of April, and wherever possible specimens of blood were taken. During this period 108 cases were admitted to sick-quarters, and single or paired specimens of blood were tested from 69 of these. Paired sera were obtained from 24 cases in which the onset of illness was towards the end of March or at the beginning of April; throat washings were taken from 17 of these. In 45 cases in which the onset was in early March, specimens of convalescent serum only were obtained. Of the 24 paired sera, 7 showed a fourfold or greater rise in titre to the R1-67 antigen, and in a further

6 there was a fourfold or greater rise in influenza A antibody. Fifteen of the 45 convalescent sera showed R1-67 antibody titres of 1/10 or more, and only one had an influenza A antibody titre of more than 1/8. In seven patients throat washings were taken within three days of onset of illness, and virus of the A.P.C. group was isolated from five of them. Throat washings from the remaining 10 patients were taken between 5 and 10 days from onset, and all were negative. Paired sera were available for all 17 patients, and 6 showed a fourfold or greater rise in antibody to the R1-67 complement-fixing antigen. Four of the five patients from whom virus was isolated were serologically positive, compared with 2 of the 10 from whom no virus was isolated.

FIG. 2.—Antibody titres in relation to time from onset of illness (R1-67; complement-fixation test; 93 specimens of serum from 61 persons). The number of sera tested is shown in each column.

In Fig. 2 the proportion of all sera with titres of 1/10 or greater is shown in relation to the number of days after onset of illness on which the specimen was taken. There appears to be a close association between antibody level and stage of the illness, since less than 10% of sera taken within 10 days of onset showed antibody at the 1/10 level, whereas 30 to 40% of sera taken between the 10th and 50th days reached this level. These findings suggest that A.P.C. virus infection was probably responsible for a large proportion of the respiratory illness in March shown in Fig. 1 for Stafford.

An analysis of the main symptoms and signs recorded for 20 of the 22 patients whose serum showed a rising antibody titre, or where a single convalescent serum had a titre of 1/10 or more, is shown in Table III. The remaining two patients were excluded because they each had two respiratory illnesses that could have been responsible for the antibody. For comparison a similar analysis is given for 75 serologi-

TABLE III.—Symptoms Observed in Outbreaks of Acute Respiratory Illness, Expressed as Percentages

	R1-67 Virus Infections at Fort Leonard Wood, 1952-3 (Hilleman <i>et al.</i> , 1955a)	A.P.C. Group Virus Infections at R.A.F. Stafford, 1955	Influenza B at R.A.F. Cosford, 1954
	100 Cases	20 Cases	75 Cases
Nasal	—	50	64
Sore throat	99	90	63
	(pharyngitis)		
Cough	99	90	89
Muscular pains	54	50	45
Sweating	—	35	52
Headache	67	> 55	70
Evidence of pneumonia	16	10	—
	(x-ray)	(clinical)	
Average duration of fever	5 days	4 days*	—

* Based on 18 cases, of which 2 were still febrile when the record was made.

cally confirmed cases of influenza B which earlier in the winter were studied by the same observers at Cosford, a neighbouring R.A.F. station. An analysis is also shown of symptoms and signs reported by Hilleman *et al.* (1955a) for 100 cases of respiratory illness in United States Army recruits in whom evidence of infection with the R1-67 virus was found. The similarity between the clinical findings in the three series is striking, the only real difference being that sore throat was less common in the cases of influenza B.

Discussion

During the four months of the survey approximately 1 in 14 of the strength of the 10 units studied was admitted to sick-quarters for more than 48 hours with a respiratory illness. In other years and in other places the admission rates might be very different. Serological tests on the 711 volunteers from whom second blood specimens were taken in March suggest that identifiable virus infections, other than influenza B, were responsible for comparatively little illness. But it was clear that only a small proportion of the 19% showing serological evidence of influenza B were ill enough to require admission to sick-quarters. The design of the investigation did not make it possible to estimate the proportion of the 19% that had an illness of similar severity while on leave or away from the station for other reasons.

The low proportion (<1%) of volunteers showing evidence of A.P.C. virus infection stands in contrast to the findings of Hilleman *et al.* (1955b) working in American Army recruit camps. None of our 10 stations was a recruit establishment. This and other factors may account for the small number of A.P.C. infections found in the present investigation, but serological surveys carried out at Colindale—of 250 factory workers in the winter of 1953-4, of 25 London families between November, 1953, and April, 1955, and of sera sent during the past two years to the Virus Reference Laboratory from sporadic cases of suspected virus disease (mainly of the respiratory tract)—did not indicate that A.P.C. viruses were a common cause of illness in this country during that period. Nevertheless, the cases detected in Stafford in 1955 and in Kirkham in 1954, together with those reported by Zaiman *et al.* (1955), are evidence that this group of viruses is present in the United Kingdom and may be responsible for illness the symptoms of which are similar to but not identical with those of influenza.

It is also worth noting that during the summer of 1955 the laboratory assisted in the investigation of outbreaks of an acute febrile illness associated with infection with viruses of the A.P.C. group in seven residential boys' schools. The clinical picture in these school outbreaks was clearly different from that observed in Stafford and apparently the same as the syndrome named pharyngo-conjunctival fever by Bell *et al.* (1955). Conjunctivitis and enlargement of the cervical and other lymph nodes was observed in most of the cases in schools but not in those in R.A.F. Stafford, and whereas cough was common in the R.A.F. patients it was infrequent among the boys.

Evidence pointing to an association between immunity to influenza A and neutralizing antibody was first presented by Francis *et al.* (1937). More conclusive evidence of this relationship in both influenza A and B infections was reported by Rickard *et al.* (1940, 1941). Less work has been done with soluble antigens. Hoyle and Fairbrother (1937) presented evidence suggesting a similar association between antibody to soluble antigen and influenza A infection. Our findings indicate that even low titres of antibody to influenza B soluble antigen are also related to immunity, though, of course, this may depend on some indirect rather than direct relationship.

Summary

During the winter of 1954-5 a survey of acute respiratory illness associated with virus infections was undertaken in 10 R.A.F. stations in England. The results

of this investigation are reported, with particular reference to influenza and adenoidal-pharyngeal-conjunctival virus infections.

Specimens of blood were taken from 1,001 volunteers in December, 1954, and again from 711 of these in March, 1955. Evidence of influenza B infection was found in 134 (19%) of those from whom two specimens were taken, the proportion in individual stations varying from 4 to 43%. A few cases of influenza A infection were detected, but only two volunteers showed evidence of A.P.C. virus infection.

Only 15 (11%) of the 134 volunteers whose serum showed a rising titre to influenza virus B were admitted to sick-quarters suffering from a respiratory illness. In two units those who had a rising titre were interviewed at the end of the investigation: approximately a third had had typical influenza during the period, a third had had minor respiratory symptoms, and the remaining third could remember no illness.

In volunteers from five stations where well-defined outbreaks of influenza B occurred, evidence of a significant association was found between pre-epidemic levels of antibody to soluble antigen and subsequent susceptibility to infection.

In March, 1955, cases of influenza-like illness associated with A.P.C. virus infection were detected in one station. The clinical and laboratory findings are described.

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To help physically handicapped people to join in social activities, the London County Council has bought a special coach, equipped with lifting apparatus, able to accommodate up to 12 disabled persons and two or three wheel-chairs. Full-depth double doors at the rear of the vehicle conceal a hydraulic "tail-lift" by means of which the wheel-chairs and their occupants can be elevated to floor-level.

IDIOPATHIC HYPERTROPHY OF THE HEART IN AFRICAN CHILDREN

A REPORT OF FOUR CASES

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Idiopathic cardiac hypertrophy is characterized by congestive cardiac failure with general enlargement of the heart, without a distinct congenital anomaly or known cardiovascular disease as a cause. The condition is rare. Kugel and Stoloff (1933) described seven cases in children. On reviewing the literature, Kugel (1939) found 52 cases reported as idiopathic cardiac hypertrophy. However, after further analysis, only 17 of the 52 reported cases showed pure hypertrophy of the heart without myocardial degeneration or inflammatory exudate or fibrosis. In the established cases death occurred within the first six years of life. At necropsy the heart was dilated and the muscle hypertrophied. The valves were normal. Ante-mortem bland thrombi were occasionally found attached to the endocardium.

The object of this paper is to present four cases of idiopathic cardiac hypertrophy in African children, to discuss the differential diagnosis, and to assess the possible relationship of our cases to the obscure cases of heart disease in African adults described by Bedford and Konstam (1946), Davies (1948), Gillanders (1951), Ball *et al.* (1954), O'Brien (1954), and the *British Medical Journal* (1954).

Case 1

An African girl aged 6 was admitted to hospital on June 26, 1951, with a five-day history of cough. There had been no previous illnesses of note, and the history of gestation, birth, and development had been quite normal. Her dietary history was satisfactory, and her six siblings were all healthy.

On admission the child was in congestive cardiac failure. The heart was clinically enlarged, but there were no significant murmurs. The blood pressure was 90/65 mm. Hg. The patient's state of nutrition was good and she weighed 49 lb. (22.2 kg.). She was afebrile. The urine contained a moderate amount of albumin but no cells or casts. The electrocardiogram revealed no abnormality. X-ray examination of the chest showed marked generalized enlargement of the heart, which pulsated poorly; the lungs, apart from congestion, were clear. The Mantoux test (1 in 1,000) was positive. The haemoglobin was 16 g. per 100 ml.; leucocyte count, 4,200 per c.mm.; erythrocyte sedimentation rate, 1 mm. in the first hour. The streptococcal antihæmolytic titre was 100 units per ml. of serum. The blood urea was 29 mg. per 100 ml., and the total serum proteins 6.1 g. per 100 ml. (2.8 g. albumin, 3.3 g. globulin). The thymol turbidity, thymol flocculation, and Takata-Ara liver-function tests were normal.

Because of the gross enlargement and poor pulsation of the heart, pericardial effusion was considered as a possible diagnosis, and two attempts at paracentesis yielded negative results. Treatment consisted of sedation, digoxin, and mersalyl, but the child's condition steadily deteriorated, and she died 11 weeks after admission. A few days before death there was an episode of pain in the chest, hæmoptysis, and hæmaturia.