THESIS.

SCARLET FEVER : AN ASSESSMENT OF THE CLINICAL VALUE OF ALKALINE TREATMENT.

by

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INTRODUCTION.

Nephritis, as a complication of scarlet fever, has occurred with varying frequency. Whenever it appears it is regarded seriously by the medical attendant. No way of preventing it has yet been found, and indeed the literature contains very little mention of attempts to find one.

Although at present scarlet fever is not a severe disease in this country and the incidence of scarlatinal nephritis is relatively low, it is unlikely that this state of affairs will continue long. An examination of the history and of the present trend of the disease leads us inevitably to this conclusion. When Sydenham first differentiated scarlatina from measles in I675 it was evidently so mild in this country that it hardly deserved to be called a disease, and was "never fatal except from excessive zeal on the part of the doctor" (I). This continued until about I750 when the fatality rose. It remained high till the end of the century when it declined, but was again high about I830 to I840. Since I860 it has been falling and is now less than I per cent. (2). This low mortality rate does not, however, prevail in Eastern Europe, where, particularly in Poland,

Bulgaria, and Roumania, there are many deaths (3). Would it not be unreasonable to suggest that the pendulum will not again swing over in this country to the side of increased severity? In fact Woods (4) states that "the present low mortality rate is probably only temporary, and that a recurrence of the more malignant type of scarlet fever may be expected". Thorp (5) believes that scarlet fever is already showing an increase in severity.

Rolleston (6) states that nephritis is as common after a mild as after a severe, attack of scarlatina. Among the cases I have observed, however, nephritis has been definitely commoner after severe attacks, and Benn (7) who has studied the question statistically in a large series of cases informs me that his experience in Leeds agrees with mine. If the recent history of the disease is examined more evidence is found in favour of nephritis being commoner after severe attacks of scarlatina. Scarlatinal nephritis was commoner in this country and on the continent a few years ago (8). At this time scarlatina was more severe. Nephritis has occurred in as many as I7 per cent. of cases of scarlet fever during one year (9), and in the M.A.B. hospitals from I900 - I909 4.6 per cent. of the I53,607 cases of scarlet fever admitted developed nephritis (I0). At the present time we find in Eastern Europe a severe form of scarlatina and a high incidence of scarlatinal nephritis. In a Moscow Children's Hospital I9.75 per cent. of 847 cases of scarlet fever developed nephritis (II). I therefore take the liberty of differing from Rolleston and suggest that when scarlet fever again becomes more virulent we shall have to face a higher incidence of scarlatinal nephritis.

It will therefore be of the greatest value if some method of preventing, or, at least, of lowering the incidence of scarlatinal nephritis can be discovered in anticipation of the rise in severity of scarlet fever.

Of the methods suggested for the prevention of the complication the one which has attracted most attention is the administration of large doses of alkalies. Osman and Carter (I2) claimed thereby to have reduced the incidence of nephritis and to have prevented simple albuminuria. Since then several other investigations into the value of this treatment have been reported in the medical press, but results have conflicted and a decision as to its real value has not been reached. Rolleston considers the question an open one and states that "the value of the method requires confirmation"(I3). Impressed by this statement by such an emminent authority and by the probability that we may soon have to face an increase in the pervalence of scarlatinal nephritis I determined to test the value of alkaline treatment in a series of scientifically controlled cases.

I have to express my grateful thanks to the following persons:-

To Dr. John Reid, Physician Superintendant of the County Hospital, Motherwell for granting me facilities for performing this experiment, and for his helpful criticism and suggestions.

To the Matron and nursing staff of that Institution for their kind co-operation, which involved for them much extra work.

To Dr. E. C. Benn, Superintendent of Seacroft Hospital

Leeds, for permission to quote the result of research which he has not yet published.

HYPOTHESIS UPON WHICH ALKALINE TREATMENT WAS SUGGESTED.

Briefly the hypothesis evolved by Osman is this:-

An important predisposing factor in the production of acute nephritis, whatever the exciting cause, is believed to be either:-

(a). A pre-existing acidosis (i.e. decrease in the plasma bicarbonate), or

(b). An unstable condition of the acid-base balance, so that a state of acidosis is too easily produced.

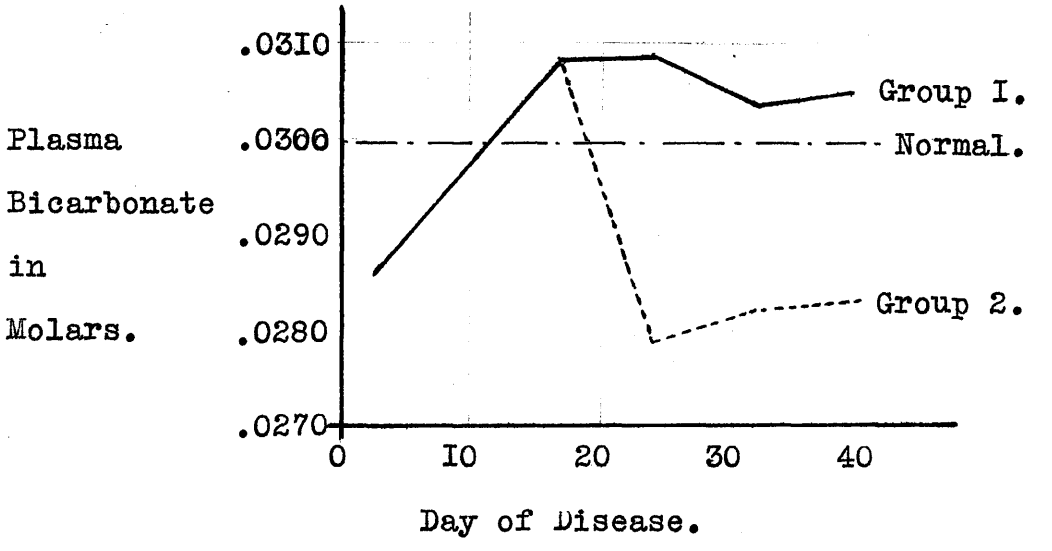
Or, to express it differently, it is suggested that in the presence of acidosis the kidney is more susceptible to injury by bacterial toxins or other poisons.

In an attempt to discover why nephritis occurred in some cases of scarlet fever and not in others, Osman and Carter(I4), among other observations, examined the plasma bicarbonate at regular intervals in a group of cases of scarlet fever and they found that these fell into two classes:-

I. The larger (75 per cent.), showed an initial acidosis during the first 6 to 8 days, followed by a period of relative alkalosis; the bicarbonate then fell gradually to normal from about the 22nd. day onwards.

2. The smaller (25 per cent.), again showed the initial acidosis and subsequent relative alkalosis, but the alkalosis was of short duration; the bicarbonate fell rapidly at about the I8th. day giving a secondary acidosis which lasted for some weeks (see Graph No. I).

Graph No. I.



Osman believed that it was in Group 2. that nephritis developed, but at the time of publishing his work had not proved it fully, having only observed one case in which nephritis developed during a secondary acidosis.

Similar observations were at the same time made in diphtheria, measles, typhoid fever, and acute streptococcal tonsillitis. In diphtheria and typhoid fever no secondary acidosis occurred. In tonsillitis marked primary and secondary acidosis occurred in most cases and these stages were separated by a period of relative alkalosis. Since tonsillitis is a frequent forerunner of acute nephritis this appeared to be significant. The time of onset of nephritis after tonsillitis is, however, much less regular than after scarlet fever, varying from the Ist. to the 55th. day in a series of 132 cases obsarved by Osman.

With the co-operation of Colwill, working at Monsall Hospital, Manchester (14), Osman estimated the pH. of the early morning urine in 109 cases of scarlet fever throughout the course of the disease. The cases could be

divided into two groups:-

(I). The "Acid" - cases with an initial urinary pH. of 5.0 or under.

(2). The "Alkaline" - cases eith an initial urinary pH. of 5.I or over.

2I cases (20 per cent.) fell into group I.

88 cases (80 per cent.) fell into group 2.

In almost all cases in both groups the urine became more acid between the I0th. and 30th. days of the disease.

Of the 2I cases in group I. I4 developed albuminuria or nephritis, and of the 88 cases in group 2. only 3 developed albuminuria or nephritis.

In the course of an investigation into the treatment of Bright's disease Osman found (I5) that in nephritis there is a diminution in the plasma bicarbonate, the cause of which he could not explain. He treated the disease by the administration of large doses of alkalies. At a certain stage in the treatment he got diuresis, a rapid reduction in oedema, a decrease in albuminuria, and disappearance of casts. At this stage the pH. of the urine was 8.3 and the plasma bicarbonate normal.

Chronic nephritis reacts unfavourably to infection, to certain drugs commonly used as general anaesthetics, and to certain metallic poisons (I6). It has been shown that intravenous sodium carbonate confers a variable degree of protection against the action of general anaesthetics on the kidneys of dogs who suffer from chronic nephritis, and that this protection is due to the maintainance of a normal acid-base balance in the blood of the animal (I7).

Nephritis can be produced in dogs by the administration of uranium nitrate, and is associated with acidosis. Oral administration of sodium bicarbonate diminishes the acidosis and confers considerable protection against uranium nephritis, the protected dogs showing much less albumin and fewer casts in the urine (I8).

Unpublished experiments by Baird suggested that nephritis could be produced in rabbits by the intravenous injection of scarlet fever toxin, and that oral administration of alkalies beforehand prevented its development (I9).

These findings led Osman to formulate the hypothesis given at the beginning of this section and to attempt the prevention of post-scarlatinal nephritis by giving doses of alkalies sufficient to keep the urine at a pH. of about 8.3.

PREVIOUS WORK ON ALKALINE TREATMENT OF SCARLATINA.

Carter and Osman (20), treated 620 cases of all ages, with alkalies in doses of 200 grains daily to patients under 7 years of age, and 400 grains. daily to those over 7 years, administered for 2I days after admission to hospital. 4 cases developed nephritis and none albuminuria. 3 of the nephritis cases occurred within 48 hours of withdrawal of alkalies, when the pH. of the urine had fallen to 5.0, 4.4, and 4.8 respectively. The 4th. case was fatal and occurred on the I4th. day of disease. In this case sections of the kidney showed previous subacute interstitial nephritic changes.

3I6 cases in the same hospital were used as controls (the authors do not state whether the two series were concurrent). In this series there were 4 cases of nephritis and 5 of albuminuria.

336 cases treated in another hospital serving the same area during the same period showed 7 cases of nephritis and I2 of albuminuria. The percentages of renal complications in these three series are as follows:-

TABLE No. 1

SERIES	No. OF CASES	% NEPHRITIS	% ALBUMINURIA	TOTAL %
Cases Receiving Alkalies	620	0·6	0	0·6
" " no "	316	1·3	1·6	2·9
" " " " in other hospital.	336	2·0	3·5	5·5

The numbers of cases of nephritis in the first two series were too small and the probable errors (I.3 and I.I respectively) relatively large. These two series, therefore, gave no conclusive proof of the value of alkalies in reducing nephritis. Albuminuria was prevented altogether, but since simple albuminuria is a transient complication of scarlet fever and leaves no apparent ill-effect its prevention is more of scientific than of practical interest.

Comparison between the first and third series is of little scientific value since it might be used as an argument that one hospital is more efficient than another, instead of evidence in favour of alkaline therapy.

Later Osman (2I and 22) published results of a further experiment conducted with similar doses of alkalies in which he claimed to have reduced the incidence of nephritis from 4.7 per cent. in 9I4 cases to 0.4 per cent. in I280 cases. He gave no figures for albuminuria.

Berry (23) gave alkalies (doses not mentioned) to I00 cases for three weeks, keeping, as far as possible, the urine alkaline to litmus during that time. He got I case of albuminuria and none of nephritis, and compared this with the incidence of albuminuria and nephritis in 28I9 cases treated without alkalies in the same hospital. Here the combined incidence of albuminuria and nephritis had been I0.6 per cent. He included in his series all cases of albuminuria whether symptomatic of another complication or not. Litmus is not a very satisfactory indicator for this work because its end point is the least definite of those of

the commonly used indicators - it is red at a pH. of 4.3 and blue at 8.2 (24). These two objections along with the small number of cases which received alkalies render these results of little scientific value.

Peters (25) gave figures for the complications in cases of scarlet fever admitted to Ham Green Hospital from I9I0 to I927. From I9I0 to I9I7 no alkalies were given and the figures were:-

Total number of Cases		3648.	
Cases that developed	nephritis	7I	- I.7 per cent.
.. .. ..	arthritis	89	- 2.4 per cent.
.. .. ..	endocarditis	30	- o.82 per cent.

From I9I8 to I927 alkalies were administered in doses of Sod. bicarb. grains 30. and Pot. bicarb. grains 5. four hourly "until urine became acid, then the dose was reduced" (the reduced dose was not stated). Urine was kept alkaline for only one week because Peters considered that it was only during that time that there was any diminution in the alkaline reserve of the body, and therefore the only time when alkalies were indicated. The figures for this period were:-

Total number of cases		4290.	
Cases that developed	nephritis	86	- 2 0 per cent.
... .	arthritis	94	- 2.2 per cent.
.. .. ..	endocarditis	33	- 0.77 per cent.

In criticising the foregoing, Osman (26) pointed out that nephritis usually occurred after the I0th. day , during which period Peters' cases were having no alkalies "the figures he gives being without value, therefore". "In fact", continued Osman "they merely show that the incidence of the

complications mentioned was practically the same in the periods I9I0 to I9I7 and I9I8 to I927". Repeated estimations made by Osman of the alkali reserve at intervals during the course of the disease showed a depleted alkali reserve persisting for many days in the majority of cases. This is why he gave alkalies so long and considered it probable that in this way he got no alkalosis in the I000 or more cases so treated.

Recently Peters (27) gave alkalies another trial in the doses recommended by Osman, and got the following results:-

TABLE No. 2.

	No. of Cases	Albuminuria	Nephritis
Test Cases	124	15 (12·1%)	5 (4·3%)
Control Cases	134	25 (18·6%)	6 (4·1%)

He thus did not appear to have reduced the incidence of nephritis, and the reduction in albuminuria, which does not matter anyhow, was very small.

OTHER SUGGESTED METHODS OF PROPHYLAXIS AGAINST NEPHRITIS.

Thyreoid Extract and Tincture of Iodine were advocated by Peters (28) in 1932, given for the first two weeks of the scarlatina in "appropriate doses according to age". He has, since then, altered his views because he found that in the winter of 1934-35 "a more severe type of scarlet fever appeared" and" in spite of administering thyreoid and iodine cases of nephritis cropped up with distressing frequency"(29). He therefore re-investigated his method with the following results (seeTable 3.).

TABLE No. 3.

	No. of Cases	Albuminuria	Nephritis
Test Cases (receiving thyreoid & iodine)	165	34 (21%)	11 (6·6%)
Controls	162	26 (16%)	9 (5·5%)

I do not know the theory of the action of thyreoid and iodine and it is not explained in either of the articles quoted. The method does not appear to have been very successful and does not seem to have appealed to other workers, as I could not find any other investigation described in the literature.

Administration of urotropine was recommended by Widowitz in 1903 as a prophylactic against nephritis, but it was shown by Steinitz to give rise to cystitis in some

cases, a phenomenon which he considered due to scarlatinal toxin rendering the vesical mucosa vulnerable to formaldehyde (30).

While administering Antiscarlatinal Serum to cases of scarlatina many workers have paid attention to its effect on complication rates. Lucchesi and Bowman (3I) found that of 3045 cases treated with serum in the Philadelphia Hospital for Infectious Diseases during the years I927, I928 and I929, I8.85 per cent. developed complications, of which I.28 per cent. were nephritis. Of 2332 cases without serum in the same hospital during the same period, the total incidence of complications was 26.I3 per cent, while that of nephritis was I.24 per cent.

Thenebe (32) reported results of 42 cases treated as early as possible with serum, and concluded that the earlier the antitoxin was given, the less was the incidence of complications. He did not say, however, whether he meant all complications or only septic complications. A series of 42 cases is, at any rate, too short from which to draw conclusions regarding renal complications.

Robb (33) observed only 3 complications (I rheumatism and 2 otitis media) in I00 cases treated with serum. On the other hand U. Friedemann and Deicher (34) reviewed 455 cases treated with antitoxin and concluded that it was "only of value in the prevention of suppuration in the early stage. No difference was noted as regards the incidence of late adenitis and nephritis in treated and untreated cases".

Rolleston (35 and 36) considers that the chief value of serum treatment lies in its power to alleviate the toxic symptoms of the acute stage, while it has little if any, action in preventing or curing complications.

These extracts may be taken as representative of authoritative opinion regarding the effect of serum treatment on the incidence of nephritis and other complications. While there are a few dissenters the general consensus of opinion is that serum alleviates symptoms of toxaemia, but has very little effect on the incidence or course of complications.

SCHEME OF PRESENT EXPERIMENT.

To judge the value of alkaline treatment as accurately as possible two series of cases were studied, one series being treated with alkalies and the other without. To ensure uniformity of conditions in these series the following precautions were taken:-

I. All cases were drawn from the same geographical area, viz. the Middle Ward of the County of Lanark.

2. The series ran concurrently: cases were placed in each series alternately, on admission to hospital.

3. All cases were treated in the one hospital, and the wards used for the two series were interchanged half-way through the experiment.

4. All cases were undoubted scarlatina, uncomplicated by concurrent infection with any other disease.

5. All cases were between the ages of one and eighteen years. It is still a matter of controversy whether a child under one year of age can develop scarlatina, and the number of patients over eighteen years was so small that they could not be considered representative of scarlet fever in adults.

6. Patients admitted after the fourteenth day of the disease were not included.

These measures prevented, as far as practicable, interference with results by

(I) differences in virulence of the infecting organisms in (a) different epidemics, (b) at different stages of an epidemic, and (c) in different districts.

(2) differences in reaction of individuals to the disease.

(3) differences and alterations in herd and individual immunity.

(4) differences in nursing and medical treatment.

(5) interference by concurrent diseases.

Patients who were suffering from albuminuria or nephritis when the alkaline treatment was due to be stopped had their alkalies continued until the complication had cleared, but where either complication supervened after the 28th. day alkalies were not recommenced.

Routine Treatment of Both Series.

Uncomplicated cases, unless severe or kept in bed for some special reason, were allowed up on the I8th. day (counting from the first appearance of the rash). Patients who had shown persistent high temperature and other evidence of excessive toxin formation were kept in bed until the I4th. day after the temperature had subsided. Complicated cases were allowed up according to the indications.

Diet was simple and was that which had been found best in the experience of the hospital:-

(I) Until subsidence of temperature - fluids only.

(2) Until I2th. day of disease - soup, milk puddings and fluids.

(3) I3th. to I8th. days - soup, fish, puddings and fluids.

(4) I9th. day onwards - full ordinary diet.

The onset of a febrile complication called for reversion to fluids.

Cases of albuminuria and nephritis showing fever were at once put back to diet I. Simple, afebrile, albuminuria was put back to diet 2, and fish was permitted four days after the urine became albumin-free. In nephritis fish was

allowed four days after the disappearance of blood and albumin from the urine, and red meat on the tenth day.

Serum.

Burroughs- Wellcome's Anti-streptococcal(Scarlatina) Serum was given to patients who

(a) had a particularly bright rash.

(b) had badly patched throats.

(c) had a high temperature accompanied by clinical signs of toxaemia.

Diphtheria antitoxin was given in doses of 4000 or 8000 units along with antiscarlatinal serum to patients with badly patched throats.

Unfortunately the administration of serum may modify slightly the value of an experiment dealing with another line of treatment, but no excuse could be upheld for depriving the above classes of patients of this valuable therapeutic measure. Any modification of my results, will, however, be very slight, since serum appears, in the light of the evidence quoted earlier, to exercise little or no control on the incidence of albuminuria or nephritis.

The serum administered in the cases under observation was as follows:-

In the test series 62 cases received on an average 40 c.cms. of Scarlatinal Antitoxin; 39 cases received diphtheria anti-toxin, the average amount given being I2,200 units.

In the control series 58 cases were given Scarlatinal Antitoxin. The average amount given was 40 c.cms. 4I cases received diphtheria antitoxin, the average amount given being I2,400 units. I case had 2 c.cms. of haemostatic serum.

No cases which developed a renal complication in the test series had had serum.

Seven cases of the control series which developed renal complications had had serum (see Table 4)

TABLE No. 4.

NAME	AGE IN YEARS	COMPLICATION	WEEK OF OCCURANCE OF COMPLICATION	SERUM ADMINISTERED	DAY OF ADMINISTRATION OF SERUM
Janet Cumming	4	Albuminuria	4 th.	10 c.cs. Anti-Scarlet	4 th.
Sam Tennant	4	"	5 th.	10 c.cs. "	6 th.
Margaret Mc. Pherson	5	"	4 th.	20 c.cs. "	5 th.
				20 c.cs. "	7 th.
				20 c.cs. "	8 th.
Gracie Paterson	4	Nephritis	5 th.	20 c.cs. "	11 th.
Mary Mc. Manus	3	"	3 rd.	10 c.cs. "	2 nd.
Alex Dixon	14	"	1 st.	20 c.cs. "	4 th.
				8,000 units A-d/p	4 th.
				20 c.cs. Anti-Scarlet	5 th.
Robert Downie	5	"	4 th.	2 c.cs. Haemostatic	37 th.

A slight possibility of the three cases of albuminuria being due to the administration of serum must be admitted. I have not been able to find in the literature any reference to nephritis having been caused by the injection of a serum. The administration of serum does not therefore appear to have interfered materially with the accuracy of my investigation.

A preliminary experiment was carried out to check Osman's dosage and determine the amount of alkali required to maintain the urine at a pH of 8.0 to 8.5.

Throughout the experiment proper the following observations were made:-

(I) Amount of urine passed in 24 hours. This was impracticable in children under the age of three years.

(2) Reaction of the urine passed by the patient immediately on waking in the morning. Urine specimens were taken immediately the patient wakened to avoid coincidence with the morning alkaline tide. This has been shown (37) to be due to increased excretion of CO_2 by the lungs, consequent on the increased respiratory activity accompanying the resumption of increased bodily exercise after the night's rest, and not to loss of acid by secretion into the stomach,during the first meal.

Reaction was estimated by means of "Universal Indicator" (British Drug Houses).

(3) Presence or absence of albumin in the early morning specimen; tested by (a) boiling, and (b) the salicyl-sulphonic acid test.

(4) Amount of albumin, if present; estimated by Esbach"s quantitative method.

(5) A specimen of urine containing albumin was submitted to (a) the guaiacol test for blood, and (b) a microscopic examination for blood and casts.

A case was considered as ALBUMINURIA if it showed asymptomatic albuminuria for three or more consecutive days.

Urine containing albumin and blood and/or casts was taken to indicate NEPHRITIS.

PRELIMINARY DETERMINATION OF REQUIRED DOSES OF ALKALIES.

Thirty patients were first given a mixture containing 40 grains of alkali three times a day, in the form of :-

R/ Sod. Bicarb. grains 40

Pot. Acetate. grains 80

Aq. Menthe. Pip. ad. fl.oz.Iss.

i.e. Half an ounce of the mixture t.d.s. at 10 a.m., 2 p.m., and 6 p.m.

The reactions of the early morning (waking) specimens in 6 cases representative of the 30 children is given in Table No.5.

TABLE NO. 5.

INITIALS	AGE IN YEARS	DAY OF DISEASE 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
T.B.	4						5·5	5·5	5·5	9·0	7·5	9·0	8·5	9·0	9·0	9·0	9·0	8·0	8·0	8·5	8·5	8·5
J.C.	5						5·5	8·5	7·5	5·5	5·5	5·5	5·0	5·5	8·5	5·5	5·5	5·0	5·5	5·5	6·0	5·5
J.M.	10				8·0	5·0	8·0	5·5	7·0	8·0	5·5	5·5	7·5	7·5	7·5	5·0	7·0	7·5	8·0	5·5	5·5	5·5
M.A.	12				5·5	5·5	7·5	7·5	5·5	5·0	5·5	7·5	7·0	7·0	5·5	5·5	7·5	5·5	5·5	5·5	5·0	8·5
W.Y.	12			4·0	5·5	6·0	6·0	7·0	7·0	7·0	5·5	5·5	7·0	6·0	6·0	5·5	6·0	7·0	7·0	6·0	5·5	8·0
B.S.	17					5·5	6·0	4·0	6·5	8·0	6·0	6·5	7·5	7·0	5·5	7·5	8·0	5·5	7·5	6·0	6·0	5·5

INITIALS	22	23	24	25	26	27	28
T.B.	8·0	7·5	9·0	7·0	8·5	DISCHARGED	
J.C.	5·5	5·0	5·5	6·0	6·5	7·0	5·5
J.M.	5·5	5·0	6·0	5·5	6·7	7·0	5·5
M.A.	8·0	6·0	8·0	8·0	5·0	8·5	5·0
W.Y.	8·0	8·5	5·5	8·0	7·5	6·5	6·0
B.S.	5·5	6·0	6·0	5·5	5·0	5·5	5·5

It soon became obvious that, except in the case of T.B., aged 4 years, the dose was quite inadequate.

A second series was put on:-

Cases under 3 years of age - 30 grains alkali t.d.s. at 10 a.m. 2 p.m., and 6 p.m.

Cases over 3 years of age - 60 grains alkali t.d.s. at 10 a.m., 2 p.m., and 6p.m.

The following eight cases are representative of the picture now obtained :-

TABLE NO. 6.

INITIALS	AGE IN YEARS	DAY OF DISEASE 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
T.H.	2				5·0	8·0	6·5	8·5	8·5	9·0	8·5	8·5	8·5	7·5	9·0	6·5	8·5	8·0	5·5	8·0	7·5	8·5
H.J.	2½				8·0	8·0	8·0		8·0	7·5	8·5	8·5	8·0	9·0	8·5	9·0	9·0	8·0	9·5	9·5	8·0	9·5
W.H.	3			5·0	5·0	5·0	5·0	8·5	9·0	7·5	8·0	8·0	8·0	5·0	8·0	8·0	5·5	8·0	8·0	8·0	8·5	6·0
J.J.	8			7·5	7·5	8·0	8·0	8·0	8·0	8·5	8·5	7·5	6·0	8·5	8·5	8·0	8·0	9·0	9·5	8·5	8·0	8·0
D.McC.	9				5·0	7·5	8·5		9·5	8·5	6·0	7·0	9·0	8·0	8·0	8·0	7·0	8·0	6·0	6·0	8·5	5·5
M.B.	11				6·0	6·0	8·5	9·0	8·0	8·0	6·0	9·0	8·0	6·5	4·0	6·0	5·5	5·5	7·5	5·5	5·5	5·5
W.B.	13				6·0	8·5	8·5	8·5	8·0	7·5	6·0	7·0	8·0	8·0	7·5	8·0	6·0	6·0	8·0	7·5	5·5	8·0
C.B.	17					5·0	6·0	7·5	8·5	8·0	8·0	7·5	7·5	7·5	6·5	8·0	7·5	6·0	7·0	8·0	8·0	7·5

INITIALS	22	23	24	25	26	27	28
T.H.	8·0	7·0	7·5	7·5	5·5	8·5	9·0
H.J.	8·5	8·0	7·0	7·0	6·0	5·5	8·0
W.H.	7·5	8·0	8·0	8·0	8·5	6·5	8·5
J.J.	7·5	8·0	7·5	5·5	5·0	8·0	8·0
D.McC.	8·0	7·5	8·0	8·0	8·5	8·0	8·5
M.B.	6·0	7·0	8·0	7·0	6·0	5·5	8·0
W.B.	7·5	7·0	7·5	8·0	8·0	7·5	8·0
C.B.	7·5	6·0	6·0	7·5	8·0	7·5	6·0

The three cases aged from II years upwards have not maintained alkalinity, while D.Mc.C., aged 9 years, showed a p.H. of less than 8.0 on eight occasions after the 7th. day, when the p.H. had first reached 8.5.

Accordingly a third experiment was tried, employing the following dosage :-

Cases under 3 years of age - 30 grains alkali t.d.s.

Cases from 3 to 7 years of age - 60 grains alkali t.d.s.

Cases from 7 to I7 years of age - 90 grains alkali t.d.s.

The following results are representative :-

TABLE NO 7.

INITIALS	AGE IN YEARS	DAY OF DISEASE 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
M.N.	3			5·0	6·5	8·0	8·0	8·5	8·5	8·5	8·0	7·0	8·5	8·5	8·5	8·5	8·0	8·0	8·0	8·0	8·0	8·5
R.P.	6			8·0	8·5	8·5	8·5	8·5	6·5	8·0	8·0	8·0	8·0	8·0	8·0	8·0	8·0	8·0	8·0	8·0	8·0	8·0
A.McD.	8				5·5	8·0	8·5	8·5	9·5	8·0	8·5	8·5	7·5	6·0	8·5	8·0	9·0	8·5	8·5	8·5	8·5	8·0
M.B.	10			6·0	8·5	8·0	8·5	8·5	8·0	8·5	8·5	8·0	8·0	8·0	8·0	8·0	8·0	8·0	7·5	8·0	7·5	8·0
S.B.	13					6·0	8·0		8·0	5·5	8·0	8·0	7·5	8·0	7·5	8·0	8·5	8·0	8·5	8·5	8·5	8·5
D.C.	17					5·0	5·0	5·0	8·0	8·0	8·0	5·5	8·5	8·5	8·0	5·0	8·5	8·5	8·5	8·5	8·5	8·0

INITIALS	22	23	24	25	26	27	28
M.N.	8·5	7·0	7·0	8·5	8·5	8·0	8·5
R.P.	7·0	8·5	8·5	8·0	8·5	8·5	8·5
A.McD	8·5	8·5	8·5	8·0	7·5	8·0	8·5
M.B.	7·5	8·0	5·5	6·5	8·0	8·0	8·0
S.B.	8·0	8·5	8·0	8·0	8·5	8·5	8·5
D.C.	8·0	8·5	5·0	8·5	8·5	8·0	8·5

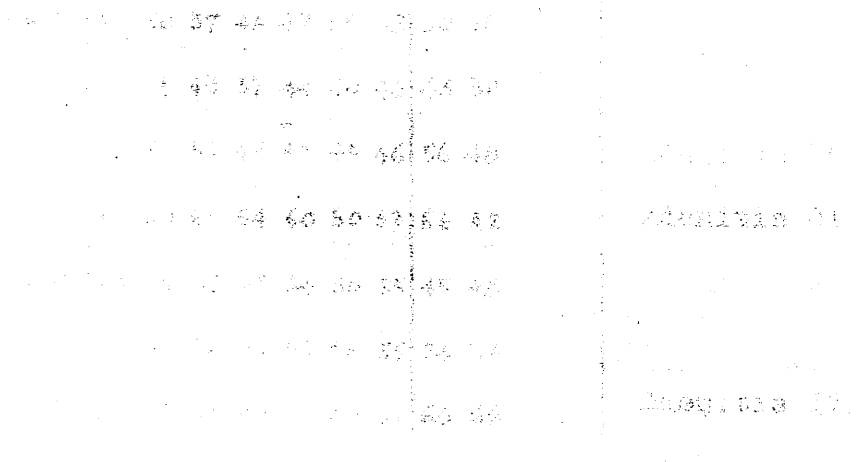
These doses gave the desired alkalinity and were therefore decided upon. The following stock mixture was used for the test series :-

R/	Sod. Bicarb.	grains 60.
	Pot. Acetate	grains I20.
	Syrup Tolutanus	fl. dr.I.
	Aq. Menthæ Pip. ad.	fl.oz.I.

EXPERIMENT PROPER.

The "Test" and "Control" series each consisted of 6I8 cases.

Tables 8 to I2 are representative of the readings obtained by the routine daily measurements of the amount of urine passed in 24 hours and the reaction of the waking specimen.



AMOUNT OF URINE PASSED IN 24 HOURS (8 a.m. - 8 a.m.) EXPRESSED IN OUNCES.

TEST SERIES.

TABLE NO 8

INITIALS	AGE IN YEARS	DAY OF DISEASE 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
E.N.	3				12	26	31	44	30	40	34	31	34	44	30	30	35	41	38	30	44	40
E.D.	4						15	25	36	37	26	30	44	48	34	37	46	37	40	34	45	40
J.S	6				16	34	32	45	40	35	47	40	42	38	35	37	44	36	35	42	36	47
H.G.	7		15	50	42	47	54	50	42	50	48	47	57	46	54	54	54	40	53	44	52	54
T.D.	8		19	45	46	42	50	41	48	52	45	54	58	42	60	44	46	52	45	56	59	58
H.M.	10			44	44	27	42	40	50	72	70	70	71	72	65	62	55	57	55	54	42	50
M.M.	11				20	40	47	35	46	50	42	60	49	52	60	46	61	55	62	65	50	57
J.M.	13				32	54	38	43	49	56	58	59	59	38	78	69	52	72	72	73	85	56
I.A.	14						16	40	40	69	70	70	72	75	70	55	61	56	56	40	58	60
A.McB.	16					36	45	37	36	43	38	56	50	61	62	62	64	35	52	52	56	53
I.M.	17				17	39	60	60	65	79	56	66	64	57	60	61	59	74	65	69	64	72	58

INITIALS	22	23	24	25	26	27	28	29	30	31	32
E.N.	47	30	36	42	47	30	32	30	42		
E.D.	32.	30	37	46	47	35	38	30	46		
J.S.	40	34	43	37	44	40	46	43	38		
H.G.	52	44	52	43	44	49	46	56	48		
T.D	42	50	65	54	60	50	52	56	42		
H.M.	60	55	69	65	64	50	55	45	48		
M.M.	56	55	52	55	52	48	55	54	54		
J.M.	86	89	92	85	84	85	84	63	68		
I.A.	56	60	62	52	60	55	56	50	50		
A.McB	56	57	40	46	44	44	50	44	40		
I.M.	72	62	60	72	64	60	66	60	55		

COMPLICATIONS.

Day of occurrence +
Day when cleared up —

Adenitis 16th. - 26th. day.

Adenitis 8th. - 13th. day.

Adenitis 17th. - 22nd. day.

Arthritis 8th. - 11th. day.

CONTROL SERIES.

TABLE NO. 9.

INITIALS	AGE IN YEARS	DAY OF DISEASE 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
A.S.	3					12	24	31	32	28	26	30	23	31	34	27	36	29	24	26	28	25
A.McG.	4			16	37	28	16	17	29	22	28	30	26	34	27	32	26	37	34	41	40	25
D.N.	6			15	42	30	22	35	47	31	36	31	40	36	40	36	42	50	54	56	40	42
E.A.	7					22	26	33	38	42	43	35	41	36	31	38	33	40	38	47	39	42
S.B.	8					17	30	41	52	+ 33	43	43	− 35	43	44	52	41	43	48	38	44	37
P.M.	10			19	31	57	42	34	44	46	42	44	46	44	47	48	53	44	50	44	46	50
R.C.	11					28	45	40	38	48	37	44	50	38	45	41	42	37	35	40	38	41
G.C.	13			21	28	45	52	44	50	44	54	47	42	52	43	50	45	46	43	46	58	42
L.S.	14				25	49	47	40	+ 42	40	36	36	38	40	− 50	37	50	38	39	46	42	48
J.C.	16				30	46	44	40	52	49	53	47	43	52	58	43	47	49	46	39	52	45
M.B.	17				24	44	53	50	51	43	56	44	54	50	48	52	51	46	49	42	52	51

INITIALS	22	23	24	25	26	27	28	29	30	31	32
A.S.	31	29	24	28	32	26	26	30	22		
A.McG.	29	33	36	29	32	30	27	34	26		
D.N.	34	38	31	44	36	33	40	32	34		
E.A.	42	44	35	40	36	41	38	37	40		
S.B.	49	47	40	43	50	40	45	41	38		
P.M.	41	39	46	48	44	45	49	40	42		
R.C.	42	46	41	36	37	41	46	52	41		
G.C.	43	47	51	50	42	47	46	50	50		
L.S.	35	40	38	46	47	42	54	45	44		
J.C.	48	44	50	51	39	46	52	49	47		
M.B.	46	58	45	44	48	50	46	52	54		

COMPLICATIONS.

Tonsillitis 9th. - I2th. day.

Otitis 8th. - I4th. day.

AVERAGE AMOUNT (IN OUNCES) OF URINE PASSED IN 24 HOURS .

Table IO shows the average amount of urine passed daily until the 30th. day of the disease, by IO children in each year of age, or, in year groups where there were fewer than IO children, by all the children in the group.

TABLE NO. 10.

AGE IN YEARS	AVERAGE DAILY AMOUNT OF URINE		AVERAGE DIURESIS	% DIURESIS
	TEST SERIES	CONTROL SERIES		
1 -	NOT MEASURED	NOT MEASURED	?	?
2 -	NOT MEASURED	NOT MEASURED	?	?
3 -	35	27	8	30
4 -	36	26	10	36
5 -	38	29	9	31
6 -	41	32	9	28
7 -	44	34	10	29
8 -	49	37	12	32
9 -	50	37	13	35
10 -	51	40	11	27
11 -	52	42	10	24
12 -	55	43	12	28
13 -	56	45	11	24
14 -	57	44	13	29
15 -	58	45	13	29
16 -	61	47	14	29
17 - 18	61	48	13	27

REACTION OF MORNING URINE IN SAME CASES AS ABOVE, EXPRESSED IN TERMS OF HYDROGEN ION CONCENTRATION.

TEST SERIES.

TABLE NO. II.

INITIALS	AGE IN YEARS	DAY OF DISEASE 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
E.N.	3				6·5	7·5	7·5	8·0	8·0	9·0	9·0	8·5	8·5	8·0	8·0	8·0	8·5	8·5	8·5	8·5	8·5	8·0
E.D.	4						5·0	8·5	9·0	8·5	8·5	9·0	9·0	8·0	6·5	8·0	9·0	9·0	8·0	8·5	7·5	8·5
J.S.	6				5·0	8·5	8·5	9·0	8·0	8·5	7·5	5·5	8·5	8·5	8·5	8·5	8·0	8·0	7·5	8·5	8·5	8·5
H.G.	7	5·0	5·5	5·5	5·0	8·0	8·0		8·5	8·0	5·0	5·5	5·0	5·0	6·5	8·0	6·5	5·5	8·0	6·0	8·5	8·5
T.D.	8		4·	8·5	8·5	8·5	8·5	8·5	6·0	8·0	8·5	8·5	8·0	6·0	8·5	8·5	8·5	8·5	8·5	8·5	8·5	8·5
H.M.	10			5·5	6·0	7·0	9·0	7·5	8·5	8·5	7·0	8·5	8·0	8·0	8·5	9·0	8·5	8·5	7·5	8·5	8·5	8·5
M.M.	11				4·0	8·5	8·5	8·5	8·5	8·5	8·5	8·5	8·5	8·5	8·5	8·0	8·5	8·5	8·5	8·0	8·5	8·5
I.A.	13				5·0	5·5	8·0	7·5	8·0	7·5	7·5	8·0	8·0	8·0	8·0	8·0	8·0	8·5	8·5	8·0	8·0	8·0
J.M.	14						6·0	5·0	8·0	8·0	9·0	7·5	8·5	8·0	8·0	8·5	8·0	8·5	7·5	8·0	7·5	8·5
A.McB.	16					6·0	6·0	8·5	7·5	8·0	8·5	8·5	8·5	8·5	8·0	8·5	7·0	8·5	8·5	8·5	8·5	8·0
I.M.	17			5·0	5·0	8·0	8·0	8·5	8·0	8·5	8·0	8·0	7·5	8·5	8·0	8·0	8·0	8·5	8·5	6·5	5·0	8·0

INITIALS	22	23	24	25	26	27	28	29	30	31	32
E.N.	8·5	7·5	8·5	8·5	8·5	8·5	8·5	8·0	5·0		
E.D.	9·0	8·5	8·5	8·0	6·0	8·5	8·5	5·5	6·0		
J.S.	8·0	8·5	8·5	8·0	8·5	8·5	8·5	8·0	6·0		
H.G.	5·0	6·0	8·0	5·0	5·5	5·0	5·0	5·5	5·0		
T.D.	9·0	8·5	6·0	9·0	8·5	8·5	8·0	5·0	5·0		
H.M.	8·5	8·5	8·5	8·5	8·5	8·0	8·5	5·0	5·0		
M.M.	5·5	8·0	8·5	8·5	8·5	8·5	8·0	7·0	5·0		
I.A.	8·0	8·0	7·0	8·0	8·5	8·0	8·0	6·0	7·0		
J.M.	8·5	8·5	8·5	8·0	7·5	7·5	6·0	6·0	6·0		
A.McB.	8·5	8·5	8·5	8·5	8·5	6·0	8·5	5·0	5·0		
I.M.	7·0	8·0	8·0	8·0	9·0	8·5	8·0	5·0	8·0		

COMPLICATIONS.

Adenitis 16th. - 26th. day.

Adenitis 8th. - 13th. day.

Adenitis 17th. - 22nd. day.

Arthritis 8th. - 11th. day.

CONTROL SERIES.

TABLE NO 12

INITIALS	AGE IN YEARS	DAY OF DISEASE 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
A.S.	3					5·0	5·0	5·0	5·5	5·0	5·0	5·0	5·0	5·5	6·0	5·0	5·0	5·0	4·5	5·0	5·5	6·0
A.McG.	4			8·0	5·0	5·0	5·0	5·0	7·0	5·0	5·0	5·0	5·0	5·0	7·0	5·0	5·5	5·0	5·5	5·5	5·0	5·0
D.N.	6			5·0	5·0	6·0	4·0	5·0	5·0	5·0	5·0	5·0	5·0	5·0	5·0	5·0	5·5	5·0	5·0	5·0	5·0	5·0
E.A.	7					5·0	5·0	5·0	5·5	8·0	5·5	5·0	5·0	6·0	5·0	5·5	5·0	5·0	5·5	5·0	5·0	4·5
S.B.	8					5·5	5·0	5·0	5·0	5·5	5·0	5·0	5·0	5·5	5·5	5·5	5·5	5·0	5·5	5·0	5·0	5·5
P.M.	10			5·0	5·0	5·0	5·5	5·0	5·0	5·0	5·0	5·0	5·0	5·0	5·5	5·0	5·0	5·0	5·0	5·0	5·0	5·5
R.C.	11						5·5	8·0	7·0	5·5	5·0	5·0	7·0	8·5	8·5	5·5	6·5	6·0	5·5	5·0	5·0	5·5
G.C.	13			5·0	5·0	6·5	5·0	5·0	5·5	5·0	5·5	5·0	5·0	5·0	5·0	5·0	5·5	5·5	4·5	5·0	5·0	5·0
L.S.	14			4·5	6·5	6·5	8·0	5·5	5·0	5·5	5·5	4·5	5·0	5·0	5·0	5·0	5·5	5·0	5·0	5·0	5·0	5·0
J.C.	16			5·0	5·0	5·0	5·5	5·5	5·5	5·0	5·0	5·5	5·0	5·0	5·0	5·5	5·0	5·0	5·0	5·0	5·5	5·0
M.B	17			5·5	5·0	5·0	5·5	5·0	5·0	4·5	5·0	5·0	4·5	5·0	5·5	5·5	6·0	5·0	5·0	5·0	5·0	5·0

INITIALS	22	23	24	25	26	27	28	29	30	31	32
A.S.	5·5	5·5	5·0	5·0	5·0	5·0	5·0	5·0	5·0		
A.McG.	5·5	5·0	5·0	5·0	5·0	5·5	5·5	5·5	5·0		
D.N.	5·0	5·5	6·0	5·0	5·0	5·0	5·0	5·0	5·0		
E.A.	5·0	5·0	5·0	5·0	5·0	5·0	5·0	5·5	5·0		
S.B	5·0	5·5	5·0	5·0	5·0	5·0	5·5	5·0	5·0		
P.M.	5·5	5·0	5·0	5·0	5·0	5·5	5·0	5·0	5·0		
R.C.	8·0	8·0	8·0	8·5	7·0	5·5	6·0	5·5	5·0		
G.C.	6·0	7·5	5·5	5·5	5·0	5·0	7·0	5·0	5·0		
L.S.	5·0	5·0	5·0	5·0	5·0	5·0	8·0	5·0	5·5		
J.C.	5·0	5·0	5·5	5·0	5·0	5·0	5·0	6·0	5·5		
M.B.	5·5	5·5	5·0	5·0	5·0	5·0	5·0	5·0	5·0		

COMPLICATIONS.

Tonsillitis 9th. - I2th. day.

Otitis 8th. - I4th. day.

The following renal complications occurred in the two series (Table No. I3.):-

TABLE NO 13

COMPLICATION	TEST SERIES	CONTROL SERIES
NEPHRITIS	6 (0·97%)	16 (2·59%)
ALBUMINURIA	9 (1·46%)	12 (1·94%)

Details of these cases are given in tables I4 - 56.

DETAILS OF CASES WHICH SHOWED RENAL COMPLICATIONS.

TEST SERIES.

DETAILS OF CASES OF ALBUMINURIA.

I. Charlotte Allan. I4 years. Admitted on 5th. day of disease. Scarlatina of average severity.

TABLE NO 14.

DAY OF DISEASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AMT. OF URINE					15	20	35	35	40	42	50	55	70	65	70	75	70	74	70	61	71
ph H.						4·0	5·0	5·5	6·0	8·0	8·0	8·5	8·0	9·0	8·5	8·5	8·0	8·5	8·0	8·0	8·5
ALBUMIN.																					
ESBACH.																					

DAY OF DISEASE	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
AMT. OF URINE	65	50	42	55	58	45	44	55	46	50	40	12+	18	30	40	38					
ph H.	7·5	8·0	8·5	8·0	8·0	8·0	8·0	5·0	4·0	5·0	4·0	4·0	4·0	5·0	5·0	5·0					
ALBUMIN.											+	+	+	Menstruating	-	-					
ESBACH.											¼	¼	Tr.			-	-				

No alkalies given after 28th. day.

---

2. Cathie Cronin. 4 years. Admitted on 5th. day of disease.

Scarlatina of average severity.

TABLE NO 15

DAY OF DISEASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AMT. OF URINE.						15	30	36	41	45	40	49	54	47	40	62	58	50	62	58	66
ℏ H.						6·0	8·0	6·0	5·0	8·0	8·5	6·0	8·0	8·5	8·0	8·5	5·5	8·0	8·0	7·5	8·0
ALBUMIN.																					
ESBACH.																					

DAY OF DISEASE	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
AMT. OF URINE.	57	64	65	62	57	54	45	32+	46+	30+	40	45									
ℏ H.	6·5	8·5	8·5	8·0	8·5	8·5	8·5	8·5	8·5	5·5	5·0	5·0									
ALBUMIN.					+	+	+	+	−	−											
ESBACH.					Tr.	Tr.	Tr.	Tr.													

Alkalies stopped on 30th. day.

---

3. Ross Leslie. 6 years. Admitted Ist. day of disease.

Scarlatina of average severity.

TABLE No 16.

DAY OF DISEASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AMT. OF URINE.		42	50	48	48	50	52	48	44	48	50	53	50	51	48	41	47	43	52	45	44
ℏ H.		4·0	8·5	8·0	8·5	8·5	8·5	8·0	8·0	6·0	8·5	8·5	8·5	8·5	8·0	8·5	8·0	8·5	8·5	8·0	8·5
ALBUMIN																					
ESBACH																					

DAY OF DISEASE	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
AMT. OF URINE	46	44	52	45	50	46	52	48	40			21+	68	60	58	62	49	60	63	78	72
p H.	8·5	8·0	8·5	8·5	8·5	8·5	8·5	5·0	5·0			5·0	5·5	5·5	6·0	4·5	5·5	5·0	5·0	5·5	5·0
ALBUMIN											+	+	+	+	+	+	+	−	+		
ESBACH												½	½	½	¼	Tr.	Tr.		Tr.		

Alkalies stopped on 28th. day, and not restarted on the advent of albuminuria.

Had slight adenitis from 20th. - 27th. days.

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4. John Robertson. 3 years. Admitted 3rd. day of disease. Scarlatina of average severity.

TABLE No 17.

DAY OF DISEASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AMT. OF URINE				15	23	43	35	30	48	26	30	45	40	48	24	30	20	22	30	38	39
p H.				5·5	5·5	6·0	8·0	8·5	6·0	8·0	8·0	8·5	8·5	8·5	8·5	8·5	8·5	8·5	8·5	8·5	8·5
ALBUMIN																					
ESBACH																					

DAY OF DISEASE	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
AMT. OF URINE	36	39	36	49	40	32	38	36	32						14+	22	24	28	21	18	22
p H.	8·5	8·5	8·5	8·0	8·5	8·5	8·0	6·5	8·0					5·0	5·0	5·0	5·0	5·5	5·0	4·5	5·0
ALBUMIN														+	+	+	+				
ESBACH														Tr.	Tr.	Tr.	Tr.				

Albuminuria was, in this case, concurrent with arthritis, but since it commenced two days before the joint pains, the case was included in this series.

Patient had severe arthritis on the 37th. and 38th. days and pain had not subsided completely till the 4Ist. day. Temperature was elevated on the 37th.(I00.4), 38th.(I00.0), and 39th.(99.8).

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5. Mary Cook. 4 years. Admitted 3rd. day of disease. Scarlatina of average severity.

TABLE No. 18

DAY OF DISEASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AMT. OF URINE.					42	38	42	46	44	46	37	40	45	40	43	42	40	44	39	46	48
ph H.				4·0	6·0	8·5	8·5	8·5	8·0	8·5	7·0	7·5	8·5	8·5	8·5	9·0	8·5	8·5	8·5	8·0	8·5
ALBUMIN.																					
ESBACH.																					

DAY OF DISEASE	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
AMT. OF URINE.	37	38	32	38	40	45	32	40	35												
ph H.	6·5	7·0	8·0	8·0	8·0	8·0	8·5	6·0	5·0												
ALBUMIN.																					
ESBACH.																					

DAY OF DISEASE	43	44	45	46	47	48	49	50	51	52	53	54	55	56
AMT. OF URINE.					63	47	39	67	56					
ph H.					5·5	5·0	5·0	5·0	5·5					
ALBUMIN.				+	+	+	+							
ESBACH.				Tr.	Tr.	¼	Tr.							

6. William Davidson. Admitted 2nd. day of disease. Scarlatina was of average severity, but there was a good deal of mucus on the posterior wall of the pharynx and the cervical glands were enlarged on the right side. The glands remained enlarged and the temperature kept in the region of 99 to 100 until the 16th. day. Albumin appeared in the urine onthe 10th. day.

It is thus doubtful whether the albuminuria here is "simple" or "symptomatic", but since it did not appear till the 10th. day and persisted for 6 days after subsidence of temperature I have included the case.

TABLE NO. 19

DAY OF DISEASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AMT. OF URINE.				NOT		MEAS		URED - CHILD							2 YEARS OLD.						
pH.			5.0	5.5	6.5	5.5	6.0	8.0	6.0	8.5	8.0	8.0	6.5	8.0	7.5	7.0	8.0	8.0	8.0	8.0	8.0
ALBUMIN.										+	+	+	+	+	+	+	+	+			
ESBACH.										½	½	½	⅓	¼	Tr.	Tr.	Tr.	Tr.			

DAY OF DISEASE	22	23	24	25	26	27	28	29	30	31	32	33	34	35
AMT. OF URINE.														
pH.	8.0	8.0	5.0	7.5	7.5	7.0	5.5	5.5	5.0					
ALBUMIN.														
ESBACH.														

DETAILS OF CASES OF NEPHRITIS.

7. Harry Marshall. 5 years. Admitted 2nd. day of disease.

Scarlatina of average severity.

TABLE NO 20

DAY OF DISEASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AMT. OF URINE		25	32	31	40	34	50	34	32	28	46	46	40	41	40	42	40	60	65	49	52
ph H.			5·5	8·5	8·5	8·5	8·5	8·5	9·0	8·0	8·5	8·5	8·5	8·5	8·5	8·0	8·5	8·5	8·5	8·0	8·5
ALBUMIN.																					
BLOOD.																					
ESBACH.																					
CASTS.																					

DAY OF DISEASE	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
AMT. OF URINE	50	42	43	61	58	58	27	33	30	42	45	46	68	54	42	45	48	39	47	42	33
ph H.	8·5	8·5	8·5	6·5	6·0	8·5	8·5	7·5	7·0	7·5	8·0	8·0	7·5	8·0	8·5	8·5	8·5	8·5	8·0	7·0	6·0
ALBUMIN.						+	+	+	+	+	+	+	+	+							
BLOOD.							+	+	+	+	+										
ESBACH.							Tr.	½	½	½	½	Tr.	Tr.	Tr.							
CASTS.							–	–	–	–	–	–	–								

Alkalies continued till 40th. day.

Other complication - Adenitis - 2nd. week.

8. Bessie Lawrie. 6 years. Admitted 4th. day of disease.
Scarlatina of average severity.

TABLE NO 21.

DAY OF DISEASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AMT. OF URINE					48	39	33	39	39	33	33	33	29	36	36	40	35	42	40	39	40
p H.					5·0	8·0	8·0	6·5	8·5	8·0	8·0	8·5	6·0	8·0	8·5	8·0	8·0	9·0	8·0	8·5	8·5
ALBUMIN.																					
BLOOD.																					
ESBACH																					
CASTS																					

DAY OF DISEASE	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
AMT. OF URINE.	43	44	46	53	49	47	41	46	47							45	43	30	36	40	30
p H.	8·5	8·0	8·5	8·5	8·5	8·5	8·5	8·5	6·0						5·5	6·0	5·5	5·0	5·5	5·0	5·0
ALBUMIN.															+	+	+	+	+	+	
BLOOD.																+	+	+			
ESBACH															½	1	¾	¼	Tr.	Tr.	
CASTS															–	–	–	–	–	–	

Nephritis was hydraemic intype and was treated by purgation, alkalies not being restarted.

Other complication - Slight rhinitis - 4th. week.

9. Samuel Dickie. 6 years. Admitted 2nd. day of disease. Scarlatina of average severity. Cervical adenitis on left side on admission.

TABLE NO 22.

DAY OF DISEASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AMT. OF URINE			34	30	35	39	44	37	44	42	42	54	46	51	42	36	25	29	39	80	73
ℏ H.			5·0	5·0	8·5	8·5	8·5	7·5	8·0	5·5	8·5	8·5	8·0	8·5	8·5	8·0	8·0	8·0	6·5	6·5	8·0
ALBUMIN																+	+	+	+	+	+
BLOOD																				+	+
ESBACH																	4	4¼	2¼	1¼	1
CASTS																		-	-	-	-

DAY OF DISEASE	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
AMT OF URINE.	69	71	35+	82	70	67	68	61	62	54											
ℏ H.	8·5	8·5	8·5	8·0	6·5	8·0	8·0	8·0	5·5	5·5											
ALBUMIN.	+	+	+	+	+																
BLOOD	+	+	+	+																	
ESBACH	1	¾	½	¼	Tr.																
CASTS	-	-	-	-	-	+	-	-	-	-											

IO. Robert Biggins. 9 years. Admitted 4th. day of disease.

Scarlatina of average severity.

TABLE NO 23.

DAY OF DISEASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AMT. OF URINE.					10	34	41	46	35	42	40	37	32	44	45	52	50	46	48	40	34
p H.					8·0	8·5	8·5	8·0	8·0	8·5	8·0	8·5	8·0	8·5	8·5	8·0	8·5	8·5	7·5	8·5	8·5
ALBUMIN																					
BLOOD																					
ESBACH																					
CASTS																					

DAY OF DISEASE.	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
AMT. OF URINE.	30	42	32	35	40	48	35	71	52	26	52	70	48	80	130	111	78	76	135	116	98
p H.	8·5	8·5	8·5	8·5	8·5	8·0	8·5	8·5	7·5	6·5	9·0	8·5	8·5	8·0	8·5	8·5	8·5	9·0	8·5	8·5	8·5
ALBUMIN		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
BLOOD						+	+	-	-	+	+	+	+								
ESBACH			Tr.	¼	¼	¼	½	½	½	½	¾	¾	1	½	¼	¼	¼	¼	Tr.	Tr.	
CASTS						-	-	-	-	-	-	-	-	-	-	-	-	-			

Alkalies were continued until 48th. day.

II. Robert Melrose. 3 years. Admitted Ist. day of disease.

Scarlatina of average severity.

TABLE NO 24.

DAY OF DISEASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AMT. OF URINE		11	27	24	36	31	40	52	52	54	62	64	70	60	62	45	60	60	62	14+	16+
p H.		5·0	6·5	8·0	8·5	8·5	8·5	8·0	8·0	8·5	8·0	8·5	8·5	8·0	8·5	8·0	8·5	8·5	8·5	8·5	8·5
ALBUMIN																			+	+	+
BLOOD																				+	+
ESBACH																				2	1¼
CASTS																				+	+

DAY OF DISEASE	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
AMT. OF URINE	23	20	18	18	31	41	29	30	30	38	47	31	33	36	30	42	42	34	30	36	32
p H.	8·5	8·0	7·0	8·5	8·0	8·0	5·5	5·5	7·0	8·5	8·5	8·5	6·0	8·5	8·5	8·5	8·5	7·0	5·0	5·0	5·0
ALBUMIN	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
BLOOD	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
ESBACH	1¼	1	1	1	1¼	1	1	2½	1¾	2	2	1	1	1	1	¾	½	¾	½	¼	Tr.
CASTS	+	+	+	+	+	+	+	+	+	—	—	+	+	—	—	—	—	—	—	—	—

DAY OF DISEASE	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
AMT. OF URINE	30	42	48	52	25	36	27	37	40	48	41	34	42	48	44						
p H.	5·0	7·5	5·5	5·0	5·0	5·0	9·0	8·0	8·5	8·0	8·5	8·5	8·5	5·5	5·0						
ALBUMIN	+	—	—	—	+	+	+	+	+												
BLOOD						Tr.															
ESBACH	Tr.					¼	½	¼	Tr.												
CASTS	—	—	—	—	—	—	—	+	—												

Alkalies continued until 55th. day.

I2. Grace Graham.7 years. Admitted 2nd. day of disease. Scarlatina of average severity.

TABLE NO 25

DAY OF DISEASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AMT. OF URINE			12	24	24	29	35	38	31	43	52	46	41	46	56	50	18	6+	10+	22	20
ph H.			7·0	8·0	8·5	8·0	8·0	8·5	8·5	8·5	8·5	8·5	8·5	8·5	8·5	8·5	8·5	8·5	8·5	5·5	5·5
ALBUMIN																	+	+	+	+	+
BLOOD																	+	+	−	−	+
ESBACH																	2	2	11	9	4
CASTS																		+	+	+	+

DAY OF DISEASE	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
AMT. OF URINE	11+	25	32	23	35	28	21+	26	27	46	49	58	58	64	60	46	39	62	40	63	64
ph H.	5·0	6·5	6·0	5·5	6·0	5·0	8·5	6·0	5·5	5·5	5·5	5·0	5·5	5·5	5·5	8·5	8·5	9·0	8·5	8·5	8·5
ALBUMIN	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
BLOOD	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			
ESBACH	2½	2	1	1½	2	1½	¾	½	½	½	½	½	¼	¼	½	¼	½	½	¾	¼	¼
CASTS	+	+	+	+	+	+	+	+	+	+	−	−	−	−	−	+	−	−	−	−	−

DAY OF DISEASE	43	44	45	46	47	48	49	50	51	52	53	54	55	56
AMT. OF URINE	60	60	56	54	62	67	50	73	77	86	62	58	66	61
ph H.	8·0	5·5	6·5	5·0	8·5	8·5	8·5	8·5	8·5	9·0	8·5	6·0	5·0	5·0
ALBUMIN	+	+	+	+	+	+								
BLOOD														
ESBACH	Te.	Te.	½	Te.	Te.	Te.								
CASTS	−	−												

At onset of nephritis patient vomited the alkaline mixture after every dose and its administration was stopped on the I9th. day. It was, however, recommenced

without trouble on the 35th. day and continued until the 53rd. day.

I3. Annie Mc.Leod. I4 years. Admitted 3rd. day of disease. Scarlatina of average severity.

TABLE NO. 26.

DAY OF DISEASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AMT. OF URINE				12	34	40	54	47	40	66	63	76	68	56	66	45	30	62	70	60	70
p H.				8.5	5.5	8.0	8.0	8.5	8.0	8.5	9.0	8.5	8.5	8.5	8.5	8.5	8.0	8.5	8.5	8.5	8.5
ALBUMIN																				+	+
BLOOD																					
ESBACH																					2
CASTS																					

DAY OF DISEASE	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
AMT. OF URINE	4+	8+	9+	11+	12+	15+	14+	33	46	56	76	79	77	53	72	70	55	55	62	40	55
p H.	6.0	5.5	5.5	5.5	6.0	8.0	8.0	8.5	8.0	8.0	6.0	5.0	8.0	6.0	6.5	5.0	7.5	8.0	8.5	7.5	5.0
ALBUMIN	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
BLOOD	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			
ESBACH	2	3	1	¾	½	¼	¼	½	½	¾	1	¾	½	¼	¼	½	Tr.	Tr.	¼	¼	Tr
CASTS		+	+	+	+	+	+	+	+	+	+	+	+	+	+	—	—	+	—	+	—

DAY OF DISEASE	43	44	45	46	47	48	49	50	51	52	53	54	55	56
AMT. OF URINE	70	64	76	88	84	78	83	83	83	88				
p H.	5.0	6.0	5.0	6.5	5.5	6.5	5.5	6.5	5.0	5.0				
ALBUMIN	+	+	+											
BLOOD														
ESBACH	¼	Tr.	Tr.											
CASTS	—	—	—											

At onset of nephritis patient vomited the alkaline mixture after each dose. The dose was reduced on the 25th. day to 20 grains t.d.s. Full doses were recommenced on the 34th. day and continued until the 49th. day.

I4. James Limerick. II years. Admitted 2nd. day of disease. Scarlatina of average severity.

TABLE No 27.

DAY OF DISEASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AMT. OF URINE			26	35	40	46	50	46	59	62	64	60	59	58	58	65	67	68	80	81	80
p_H.			8·5	8·5	8·5	8·0	8·5	8·5	8·5	8·5	8·5	8·0	8·5	9·0	8·5	8·5	8·5	8·5	8·5	8·5	8·5
ALBUMIN																+	+	+	+		
BLOOD																+	+	+			
ESBACH																¼	Tr.	Tr.	Tr.		
CASTS																–	–	–	–	–	–

DAY OF DISEASE	22	23	24	25	26	27	28	29	30	31	32	33	34	35
AMT. OF URINE	85	79	80	80	70	66	65	65	56					
p_H.	8·5	8·0	8·5	8·5	7·0	8·5	8·5	7·5	5·0					
ALBUMIN														
BLOOD														
ESBACH														
CASTS	–	–	–											

The patient gave a history of "kidney trouble" with "blood in the urine off and on" for the past two years. The cause of the original attack could not be ascertained.

I5. Nicholas Hutchison. 8 years. Admitted 3rd. day of disease. Scarlatina of average severity.

TABLE No 28.

DAY OF DISEASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AMT. OF URINE				49	45	52	53	49	52	42	53	64	69	82	49	62	61	78	58	57	58
p_H.				5·0	5·5	8·5	8·0	8·5	8·5	8·5	8·0	7·0	8·5	8·0	8·5	8·0	8·0	9·0	8·5	8·5	8·5
ALBUMIN																					
BLOOD																					
ESBACH																					
CASTS																					

DAY OF DISEASE	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
AMT. OF URINE	73	63	45	39	20	30	46	31	8+	21	28	28	85	69	152	133	168	111	113	94	80
p_H.	8·5	8·5	8·0	8·5	8·5	8·5	8·0	8·5	6·0	7·0	5·5	7·5	6·0	8·0	8·5	6·5	8·5	8·5	8·0	8·5	8·5
ALBUMIN				+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
BLOOD				+	+	+	+	+	+	+	+	+	+	+	+						
ESBACH				2	2	1	½	¼	¼	½	¼	1	½	½	¼	Tr.	Tr.	Tr.	Tr.		
CASTS				−	−	+	+	+	+	+	−	−	+	−	−	+	−	−			

CONTROL SERIES.

DETAILS OF CASES OF ALBUMINURIA.

I. Janet Cumming. 4 years. Admitted 4th. day of disease.

On admission the child was moderately ill. The throat was very red and the tonsils large, congested and patched. The cervical glands on the left side were moderately enlarged, and slight purulent rhinorrhoea was present.

TABLE NO. 29.

DAY OF DISEASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AMT. OF URINE.					16	37	28	24	17	22	29	34	30	32	26	37	28	30	32	26	35
pH.					4·5	5·0	5·0	5·5	5·0	5·0	5·0	5·0	5·0	5·5	6·0	4·5	5·0	5·5	4·5	5·0	5·0
ALBUMIN																					
ESBACH																					

DAY OF DISEASE	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
AMT. OF URINE	37	32	29	40	38	45	40	36	41	51	70	68	84	80	90	100	82	63	58	74	60
pH.	5·5	5·0	5·0	5·0	5·5	5·0	5·0	5·0	4·5	5·0	5·0	5·0	5·5	5·0	5·0	5·5	5·0	5·0	5·0	5·0	5·0
ALBUMIN										+	+	+	+	+	+	−	−	+	+	+	−
ESBACH											Tr.	½	½	¼	¼			¼	Tr.	Tr.	

DAY OF DISEASE	43	44	45	46	47	48	49	50	51	52	53	54	55	56
AMT OF URINE	41	50	44	51	40	36	41	44	58	20	28	40	32	28
pH.	5·0	5·0	5·5	5·0	5·5	5·0	6·5	5·5	7·0	5·0	5·0	5·5	5·0	5·0
ALBUMIN	+	+	−	+	+									
ESBACH	¼	¼		½	Tr.									

The original complications cleared up by the 8th. day of the disease and did not return.

2. George Causie. 8 years. Admitted 3rd. day of disease. Scarlatina of average severity.

TABLE NO. 30

DAY OF DISEASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AMT. OF URINE					19	31	42	34	57	44	44	36	42	47	53	42	44	50	39	45	38
p H.					5·5	5·0	5·0	5·0	5·5	5·0	5·0	5·0	5·5	5·5	5·5	5·5	5·0	5·5	5·5	5·0	5·0
ALBUMIN																	+	+	+		
ESBACH																	¼	Tr.	Tr.		

DAY OF DISEASE	22	23	24	25	26	27	28	29	30	31	32	33	34	35
AMT. OF URINE	50	48	42	44	55	41	46	42	40					
p H	5·0	5·5	5·0	5·0	5·0	5·0	5·5	5·0	5·0					
ALBUMIN														
ESBACH														

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3. Sarah Byrnes. 4 years. Admitted 3rd. day of disease. Scarlatina of average severity.

TABLE NO. 31.

DAY OF DISEASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AMT. OF URINE				30	22	16	31	26	34	38	32	36	30	33	29	33	28	24	31	32	26
p H.				5·0	5·5	5·0	5·0	6·5	5·5	7·5	7·0	5·0	8·0	5·0	5·0	5·5	5·0	5·5	5·0	5·5	5·0
ALBUMIN																			+	+	+
ESBACH																			¼	Tr.	Tr.

DAY OF DISEASE	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
AMT. OF URINE	19+	31	42	39	45	26	32	30	38												
ph H.	5·0	6·5	5·0	8·5	5·0	5·5	5·0	5·5	5·0												
ALBUMIN																					
ESBACH																					

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4. John Mc.Cafferty. 6 years. Admitted 2nd. day of disease. Scarlatina of average severity.

TABLE NO. 32

DAY OF DISEASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AMT. OF URINE			18	24	36	32	45	50	38	44	36	42	40	36	31	42	45	42	36	40	45
ph H.			5·0	5·0	5·5	5·5	5·0	5·0	5·0	6·0	6·0	5·5	6·0	5·0	5·0	5·5	5·5	5·0	5·5	5·0	5·5
ALBUMIN																				+	+
ESBACH																				¼	½

DAY OF DISEASE	22	23	24	25	26	27	28	29	30	31	32	33	34	35
AMT. OF URINE	41	55	48	74	76	66	72	62	58	41	52			
ph H.	5·0	5·5	5·0	5·0	5·0	5·5	5·0	6·5	5·0	5·0	5·0			
ALBUMIN	+	+	+	+	+	+								
ESBACH	½	½	¼	Tr.	Tr.	Tr.								

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5. Georgina Izatt. 13 years. Admitted 2nd. day of disease. Scarlatina of average severity. On admission pus was exuding from the tonsillar follicles, and the temperature did not subside until the 6th. day.

TABLE No. 33.

DAY OF DISEASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AMT. OF URINE			21	28	45	52	44	50	46	54	42	47	43	52	45	50	46	43	58	46	42
ph H.			5·0	5·0	6·5	5·0	5·0	5·5	5·0	5·5	5·0	5·0	5·0	5·0	5·0	5·5	5·5	5·0	5·0	4·5	6·0
ALBUMIN									+	+	+										
ESBACH									¼	Tr.	Tr.										

DAY OF DISEASE	22	23	24	25	26	27	28	29	30	31	32	33	34	35
AMT. OF URINE	47	43	51	50	47	42	46	50	50					
ph H.	7·5	5·0	5·5	5·5	7·0	5·0	5·0	5·0	5·0					
ALBUMIN														
ESBACH														

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6. Rachael Cowan. 11 years. Admitted 5th. day of disease. Scarlatina of average severity.

TABLE No 34

DAY OF DISEASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AMT OF URINE						33	45	40	40	38	48	37	44	42	45	41	40	50	38	35	40
ph H.						5·5	5·0	5·5	5·5	6·0	5·0	5·0	5·0	5·5	5·0	5·0	5·5	5·0	5·5	5·0	5·0
ALBUMIN																					
ESBACH																					

DAY OF DISEASE	22	23	24	25	26	27	28	29	30	31	32	33	34	35
AMT. OF URINE	41	38	42	48	37	36	41	46	52	45	41			
ph H.	5·0	5·0	5·0	5·5	5·0	5·0	5·0	5·5	5·0	5·0	5·0			
ALBUMIN				+	+	+	+	+						
ESBACH				¼	½	¼	¼	tr.						

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7. Samuel Tennent. 4 years. Admitted 5th. day of disease. Scarlatina of average severity with mild double-sided adenitis and a discharging ear (left) on admission.

TABLE No 35

DAY OF DISEASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AMT. OF URINE						12+	9+	22	25	29	19	32	28	33	35	30	24	28	22	25	26
ph H.						5·0	5·5	5·0	5·5	5·0	7·5	5·0	5·5	5·0	5·5	8·5	7·0	5·0	5·0	5·5	5·5
ALBUMIN																					
ESBACH																					

DAY OF DISEASE	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
AMT. OF URINE	31	27	24	30	36	34	35	32	29						28	37	36	25	28	26	
ph H.	5·5	5·0	5·0	5·0	5·5	5·0	6·5	5·0	5·0						5·5	5·0	5·0	5·0	5·5	6·0	
ALBUMIN															+	+	+				
ESBACH															¼	tr.	tr.				

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8. Edward Sweeny. 7 years. Admitted 5th. day of disease. Scarlatina of average severity. Tonsils enlarged, congested, and spotted on admission.

TABLE No. 36.

DAY OF DISEASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AMT. OF URINE						38	41	45	36	33	40	38	45	37	47	35	33	32	38	44	39
p. H.						5·5	6·0	5·0	5·0	5·5	5·0	5·0	5·5	7·0	5·0	5·0	5·5	5·0	4·5	5·0	5·0
ALBUMIN																					
ESBACH																					

DAY OF DISEASE	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
AMT. OF URINE	45	50	66	95	90	75	81	75	76	61	51	42	45								
p H.	5·0	5·0	5·0	4·5	5·0	5·0	5·5	5·0	5·0	5·0	5·0	5·0	5·5								
ALBUMIN		+	+	+	—	+	+														
ESBACH		¼	½	¼		¼	Tr.														

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9. David Aitken. 6 years. Admitted 9th. day of disease. Rash and sore throat had not been marked. On admission the child was desquamating, and the throat was not congested.

TABLE No. 37.

DAY OF DISEASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AMT. OF URINE								47	49	57	59	48			51	43	36	42	45	38	40
p H.								5·0	5·5	5·0	5·0	5·5			5·0	5·0	5·0	4·5	5·0	6·5	6·0
ALBUMIN													+	+	+	+	+				
ESBACH													Tr.	¼	¼	Tr.	Tr.				

DAY OF DISEASE	22	23	24	25	26	27	28	29	30	31	32	33	34	35
AMT. OF URINE	31	36	42	32	38	34	40	50	44					
℘ H.	5·5	5·5	5·0	5·5	5·5	5·0	5·0	5·0	5·0					
ALBUMIN														
ESBACH														

IO. Ronald Cameron. II.years. Admitted 2nd. day of disease. Scarlatina of average severity.

TABLE No. 38.

DAY OF DISEASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AMT. OF URINE			26	38	57	54	48	55	60	52	56	40	48	56	52	43	64	55	50	56	67
℘ H.			5·0	5·0	5·5	5·0	5·5	6·0	5·0	5·0	5·5	5·0	6·0	5·0	5·0	5·5	5·5	6·0	5·0	5·0	5·0
ALBUMIN																					
ESBACH																					

DAY OF DISEASE	22	23	24	25	26	27	28	29	30	31	32	33	34	35
AMT. OF URINE	54	44	35	21	18	32	18	18	19	56	64	71	52	48
℘ H.	5·0	5·0	5·5	5·0	5·0	5·5	5·0	5·0	7·5	6·0	5·0	5·0	5·0	5·5
ALBUMIN	+	+	+	+	+	+	+	+	+	+	+			
ESBACH	¼	¼	½	½	1	¾	1	½	¼	Tr.	Tr.			

II. Anna Russel. 5 years. Admitted 17th. day of disease. History of sore throat three weeks ago. No rash had been noticed. The child had vomited at onset of illness. There was desquamation on admission.

TABLE No. 39.

Day of Disease	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Amt. of urine																		19	23	18	24
ph H.																		5·5	5·0	5·0	5·5
Albumin																					+
Esbach																					½

Day of Disease	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
Amt. of urine	20	19	19	15	27	58	52	50	30	25	27	23	25	30	23	40	31	28	30	26	31
ph H.	5·0	5·0	5·5	6·0	5·0	4·5	4·5	6·0	5·0	5·5	5·0	5·0	5·0	5·0	5·0	5·0	5·5	5·0	5·0	5·0	5·0
Albumin	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+					
Esbach	1	½	½	¼	¼	¼	¼	½	¼	Tr.	Tr.	¼	Tr.	Tr.	Tr.	Tr.					

I2. Margaret Mc.Pherson. 5 years. Admitted 3rd. day of disease.

On admission the child was very ill. The temperature was 103.2, the rash was bright and the tonsils patched. The throat remained very dirty and the temperature did not subside till the 11th. day. Temperature did not remain settled, and rose to 99 on the23rd. day, 100.2 on the 26th. day, and on the 29th. day it reached 102 and was accompanied by rhinitis and bilateral adenitis. Albumin appeared in the urine at this period, but there had also been three days of albuminuria previously.

Tables overleaf.

TABLE No 40.

DAY OF DISEASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AMT. OF URINE				9+	18	22	19	32	26	30	34	24	16	25	29	19	23	24	18	21	33
ph H.				5·0	5·0	5·0	5·0	5·0	5·0	5·0	5·0	5·0	5·5	5·0	5·0	5·0	5·0	5·0	4·5	5·0	5·0
ALBUMIN																	+	+	+		
ESBACH																	¼	¼	Tr.		

DAY OF DISEASE	22	23	24	25	26	27	28	29	30	31	32	33	34	35
AMT. OF URINE	36	30	29	32	22	18	24	16	25	24	30	27		
ph H.	5·0	5·0	5·0	5·0	5·0	5·0	5·0	5·0	5·0	5·5	5·0	5·0		
ALBUMIN				+	+	+	+	+						
ESBACH				¼	½	¼	Tr	Tr.						

I3. Mary Paterson. 4 years. Admitted 2nd. day of disease. Scarlatina of average severity on admission, but temperature did not subside till the 6th. day.

TABLE No. 41

DAY OF DISEASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AMT. OF URINE			16	28	17	22	37	34	30	26	32	47	41	28	34	40	32	35	35	30	40
ph H.			5·0	5·0	6·5	5·0	5·0	5·0	5·0	5·0	5·5	5·5	5·0	5·0	5·0	5·5	5·0	5·0	5·5	5·0	5·5
ALBUMIN															+	+	+	+	+	+	
ESBACH															¼	½	1¼	1¾	2	1	

DAY OF DISEASE	22	23	24	25	26	27	28	29	30	31	32	33	34	35
AMT. OF URINE	38	34	31	30	32	42	32	30	35	40	32	34		
ph H.	5·0	5·0	5·0	5·5	5·0	5·0	5·0	5·5	6·0	5·0	5·0	5·0		
ALBUMIN	+	+	+											
ESBACH	¼	Tr.	Tr.											

I4. Thomas Dixon. 4 years. Admitted 3rd. day of disease. Scarlatina of average severity on admission, but temperature did not subside till the 8th. day.

TABLE No. 42.

DAY OF DISEASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AMT. OF URINE				17	29	36	24	29	32	34	28	33	25	32	30	25	39	45	31	36	28
p_H.				5·5	5·0	5·5	5·5	5·0	5·0	5·5	5·5	5·0	5·0	5·0	5·0	5·0	5·5	5·0	5·0	5·5	5·0
ALBUMIN																					
ESBACH																					

DAY OF DISEASE	22	23	24	25	26	27	28	29	30	31	32	33	34	35
AMT. OF URINE	36	30	35	28	32	29	36	31	28	38	32	34	28	
p_H.	5·0	5·5	5·0	5·5	5·5	5·0	5·0	5·5	5·5	5·0	4·5	5·0	5·0	
ALBUMIN	+	+	+	+	+	+	+	+						
ESBACH	¼	½	½	1½	1	½	¼	tr.						

I5. Bridget Faulds. 4 years. Admitted 2nd.day of disease. Scarlatina of average severity.

TABLE No. 43.

DAY OF DISEASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AMT. OF URINE			22	25	17	28	36	34	32	36	30	34	41	38	42	53	60	55	50	52	44
p_H.			6·0	5·0	5·5	5·0	5·0	5·0	5·0	5·0	5·0	5·0	5·5	5·0	5·0	5·5	5·0	6·0	5·5	5·5	5·0
ALBUMIN						+	+	+	+	+	+	+	+	+	+						
ESBACH						¼	½	½	½	½	¼	¼	tr.	tr.	tr.						

DAY OF DISEASE	22	23	24	25	26	27	28	29	30	31	32	33	34	35
AMT. OF URINE	38	40	30	34	29	35	30	32	26					
p H.	5·5	4·5	5·0	5·0	5·0	5·0	5·0	5·0	5·5					
ALBUMIN														
ESBACH														

I6. Helen Mc. Gafferty. 8 years. Admitted 2nd day of disease. Scarlatina of average severity.

TABLE. NO. 44.

DAY OF DISEASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AMT. OF URINE			10+	29	34	38	42	36	50	41	33	38	42	39	48	36	44	50	40	36	38
p H.			5·5	5·5	6·0	5·0	5·0	5·5	5·0	5·5	5·0	5·0	5·0	5·0	5·5	5·0	6·0	5·0	5·0	5·0	5·0
ALBUMIN																					
ESBACH																					

DAY OF DISEASE	22	23	24	25	26	27	28	29	30	31	32	33	34	35
AMT. OF URINE	34	45	36	40	34	32	20	24	38	32				
p H.	5·5	5·0	5·0	5·0	5·0	5·0	5·0	7·0	5·0	5·0				
ALBUMIN						+	+	+						
ESBACH						¼	¼	¼						

DETAILS OF CASES OF NEPHRITIS.

17. Robert Downie. 5 years. Admitted 3rd. day of disease.

Scarlatina of average severity.

TABLE No. 45

DAY OF DISEASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AMT. OF URINE				19	28	27	35	31	36	36	32	29	35	34	28	31	32	27	23	26	30
p H.				5·0	5·0	5·0	5·5	5·0	5·0	5·0	6·0	5·5	5·5	7·5	6·0	5·0	5·0	5·5	8·5	8·0	5·0
ALBUMIN																					
BLOOD																					
ESBACH																					
CASTS																					

DAY OF DISEASE	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
AMT. OF URINE	32	34	31	27	29	34	32	21	24	30	47	49	42	63	28	38	40	28	27	24	29
p H.	5·0	5·5	6·0	5·5	5·0	5·5	6·0	5·0	5·0	5·0	5·0	5·5	5·0	5·0	5·0	5·5	5·0	5·0	5·5	6·0	6·0
ALBUMIN									+	+	+	+	+	+	+	+	+	+	+	+	+
BLOOD									+	+	+	+	+	+	+	+	+	+	+	+	+
ESBACH									1	¾	½	¼	½	¾	¾	½	½	½	½	1	½
CASTS										+	+	+	+	+	+	+	+	+	+	+	+

DAY OF DISEASE	43	44	45	46	47	48	49	50	51	52	53	54	55	56
AMT. OF URINE	15	39	40	52	49	58	54	42	46					
p H.	5·0	5·0	5·0	6·5	5·0	5·5	5·0	5·5	4·5					
ALBUMIN	+	+	+											
BLOOD														
ESBACH	½	¼	Tr.											
CASTS	+	+	+	+	+									

On the 35th. day the patient developed a severe attack of purpura haemorrhagica and much blood was lost by epistaxis, rendering the patient very weak for three days. However, haemorrhage had completely ceased by the 39th. day and did not recur. It did not appear to affect, in any way, the course of the nephritis.

I8. Peter Watson. 4 years. Admitted 2nd. day of disease. Scarlatina of average severity.

TABLE NO. 46.

DAY OF DISEASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AMT. OF URINE			10	17	24	32	28	31	24	27	26	32	31	29	18	24	31	26	28	23	35
p H.			6·0	5·0	5·0	5·0	5·5	5·5	7·0	5·0	5·0	5·0	5·0	5·5	6·0	5·0	5·0	5·0	5·0	5·0	5·5
ALBUMIN																					
BLOOD																					
ESBACH																					
CASTS																					

DAY OF DISEASE	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
AMT. OF URINE	42	20	26	22	25	19	31	26	24	20	18	17	23	29	21	31	25	34	38	33	40
p H.	5·5	6·0	5·0	5·0	5·0	5·0	4·5	5·0	4·5	5·0	5·0	5·5	5·0	5·0	5·5	6·0	5·0	5·0	5·0	5·5	7·0
ALBUMIN					+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
BLOOD													+	+	−	+	+				
ESBACH					½	½	1	1	2½	2	1½	1	1½	1	1¾	½	½	¼	1	1½	¼
CASTS													−	−	−	−	−	−	−	−	−

Continued overleaf.

DAY OF DISEASE	43	44	45	46	47	48	49
AMT. OF URINE	38	41	24	30	25	22	28
pH.	6·0	5·5	5·0	5·0	5·0	5·0	5·0
ALBUMIN	+						
BLOOD							
ESBACH	Tr						
CASTS							

I9. Gracie Paterson. 4 years. Admitted 8th. day of disease. Scarlatina of average severity. Tonsils large and patched on admission.

TABLE No. 47.

DAY OF DISEASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AMT. OF URINE								24	28	33	23	38	32		31	26	29	31	25	30	28
pH.								5·0	5·0	5·0	5·5	5·0	5·5		5·0	5·0	5·0	4·5	5·0	5·5	5·0
ALBUMIN																					
BLOOD																					
ESBACH																					
CASTS																					

DAY OF DISEASE	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
AMT. OF URINE	36	28	24	33	31	30	25	28	29	26	32	29	30	35	28	26	31	24	27	21	24
pH.	5·5	5·0	5·5	5·0	5·0	5·0	5·0	5·5	6·0	5·5	5·0	5·0	5·5	5·0	5·0	5·0	4·5	5·0	5·5	5·0	5·0
ALBUMIN																			+	+	+
BLOOD																			+	+	+
ESBACH																			½	½	¼
CASTS																			—	—	—

Continued overleaf.

DAY OF DISEASE	43	44	45	46	47	48	49
AMT. OF URINE	22	31	27	29	34	26	25
p H.	5·0	4·5	5·0	5·0	5·0	5·0	5·5
ALBUMIN	+	+	+				
BLOOD	+						
ESBACH	½	Tr.	Tr.				
CASTS	−	−	−	−			

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20. Alex Dixon. I4 years. Admitted 3rd. day of disease.

On admission the boy looked "toxic", the temperature was IOI.6, and the throat was very red and patched. The temperature had subsided by the 5th. day.

TABLE NO. 48

DAY OF DISEASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AMT. OF URINE				28	19	18	6	12	11	21	45	44	65	72	70	62	65	62	55	56	62
p H.				5·0	5·0	5·0	5·0	4·5	4·5	4·5	5·0	5·5	5·5	5·0	5·0	5·5	4·5	5·5	5·0	5·0	5·0
ALBUMIN						+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
BLOOD						+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
ESBACH						½	1	1½	½	½	½	½	½	¼	¼	½	½	½	½	½	¼
CASTS						−	−	−	−	−	−	+	+	+	−	−	+	+	+	+	+

DAY OF DISEASE	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
AMT. OF URINE	52	60	42	55	62	51	48	54	60	53	49	54	58								
p H.	5·0	5·5	5·0	5·0	5·0	7·0	5·5	6·0	5·0	5·0	5·0	5·0	5·0								
ALBUMIN	+	+	+	+	+																
BLOOD																					
ESBACH	¼	Tr.	Tr.	Tr.	Tr.																
CASTS	+	+	−	+	−	−	−	+	−												

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21. Mary Mc.Manus. 3 years. Admitted 1st. day of disease.

On admission the temperature was 102.0 and the rash was very bright, especially on the chest. The throat was more congested than usual.

TABLE No. 49.

DAY OF DISEASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AMT. OF URINE		6	14	28	21	32	22	26	25	19	24	28	23	26	20	22	17	34	31	28	33
p H.		5.0	5.0	5.5	5.0	5.0	5.0	5.5	7.5	7.0	5.0	5.0	5.0	8.5	6.0	5.5	5.0	5.0	5.0	5.5	5.0
ALBUMIN																			+	+	+
BLOOD																			+	+	+
ESBACH																			½	1	½
CASTS																			−	−	−

DAY OF DISEASE	22	23	24	25	26	27	28	29	30	31	32	33	34	35
AMT. OF URINE	28	30	24	22	26	21	25	22	31	27	29	26	24	
p H.	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.5	5.0	5.0	7.0	5.0	
ALBUMIN	+	+	+	+	+	+	+							
BLOOD	+	+	+											
ESBACH	½	¼	¼	½	¼	tr.	tr.							
CASTS	−	+	+	+	−	−	+	−	−	−				

22. Jean Buchanan. 7 years. Admitted 4th. day of disease. Scarlatina of average severity.

TABLE. No.50.

DAY OF DISEASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AMT. OF URINE					22	36	33	38	28	32	43	35	41	36	32	38	31	33	32	20	28
ph H.					6·0	5·5	5·0	7·5	5·0	5·0	5·0	5·0	7·0	7·0	6·0	5·5	5·0	5·0	5·0	5·0	4·5
ALBUMIN																			+	+	+
BLOOD																					
ESBACH																			½	¾	¾
CASTS																			−	−	−

DAY OF DISEASE	22	23	24	25	26	27	28	29	30	31	32	33	34	35
AMT. OF URINE	32	43	41	34	36	27	31	38	32	34	42	37	48	44
ph H.	4·5	5·0	5·0	5·0	5·0	4·5	5·0	5·0	5·0	5·5	5·5	6·0	5·0	5·0
ALBUMIN	+	+	+	+	+	+	+	+	+	+				
BLOOD					+	+	+	+	+					
ESBACH	1	1	¾	¾	2	1½	½	¾	¼	tr.				
CASTS	−	−	−	−	+	+	−	−	+	−	−	−	−	

23. Alice Sheeny. 6 years. Admitted 2nd. day of disease. Scarlatina of average severity in general symptoms and signs, but throat very red and coated with mucus.

TABLE NO. 51.

DAY OF DISEASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AMT. OF URINE			24	28	36	31	33	29	45	42	36	48	31	35	46	42	53	40	24	20	16+
pH.			5.5	5.0	5.0	5.0	5.5	6.5	6.0	5.0	5.0	5.5	5.5	5.0	5.5	5.0	5.0	5.5	5.0	5.0	5.0
ALBUMIN																				+	+
BLOOD																					
ESBACH																				4	8
CASTS																					

DAY OF DISEASE	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
AMT. OF URINE	32	30	35	35	29	28	26	40	44	41	35	38	36	33	41	32	45	51	36	41	38
pH.	5.0	5.5	5.0	5.0	5.0	5.0	5.0	4.5	5.0	4.5	5.5	5.0	5.0	5.0	5.0	5.0	5.5	5.0	5.0	5.0	5.0
ALBUMIN	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
BLOOD							+	+	+	+	+	+	+								
ESBACH	12	10	6	2	1	1	1	2	1	3	2	1½	1	1	½	¾	1¼	1	1	1½	½
CASTS							−	−	+	+	−	+	+	+	+	−	+	+	−	−	−

DAY OF DISEASE	43	44	45	46	47	48	49	50	51	52	53	54	55	56
AMT. OF URINE	44	43	39	40	35	36	32	40	42	51	49	43		
pH.	5.5	5.0	7.0	4.5	5.0	5.0	5.0	5.0	5.0	6.0	5.5	5.0		
ALBUMIN	+	+	+	+	+	+								
BLOOD														
ESBACH	½	1	1	1	¼	¼								
CASTS	−	−	−	−	−	−								

24. John Dunn. 4 years. Admitted 2nd. day of disease. Scarlatina of average severity.

Table No 52.

Day of Disease	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Amt. of urine			10	22	30	31	24	26	29	38	40	28	31	24	27	25	22	22	19+	20+	30
p H.			5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.5	5.0	5.0
Albumin																	+	+	+	+	+
Blood																	+	+	+	+	+
Esbach																	2	6	10	7	8
Casts																	−	−	−	−	+

Day of Disease	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
Amt. of urine.	25+	30	35	20	29	21	34	25	30	24	28	31	22	32	26	31	34	27	24	30	32
p H.	5.0	5.5	5.0	5.0	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Albumin	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Blood	+	+	+	+	+	+	+	+	+	+	+										
Esbach	4	2	2	5	3	1	2	1	2	2	1	1	3/4	½	½	¼	½	½	½	½	Tr.
Casts	+	+	+	+	+	+	+	+	+	+	+	+	−	−	−	−	−	−	−	−	−

Day of Disease	43	44	45	46	47	48	49
Amt. of urine.	38	42	45	35	32	40	29
p H.	5.0	5.5	5.5	5.0	6.0	5.0	5.0
Albumin							
Blood							
Esbach							
Casts	−	−					

25. John Ray. 8 years. Admitted 3rd. day of disease.
Scarlatina of average severity.

TABLE No 53.

DAY OF DISEASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AMT. OF URINE				18	31	27	38	32	40	41	37	36	42	35	31	27	35	28	25	32	26
pH.				5·0	5·0	6·0	7·0	5·0	5·0	5·0	5·5	5·0	5·0	8·0	5·5	5·0	5·0	5·0	4·0	5·0	5·0
ALBUMIN																			+	+	+
BLOOD																			+	+	+
ESBACH																			¼	¼	½
CASTS																			−	−	−

DAY OF DISEASE	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
AMT. OF URINE	16	24	22	20	18	17	16	24	23	28	37	30	45	48	50	30	34	24	30	26	30
pH.	4·5	5·0	5·0	4·0	5·5	5·0	5·0	5·0	5·0	5·0	5·5	5·5	6·0	5·0	5·0	5·0	5·0	5·0	5·0	5·0	5·5
ALBUMIN	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
BLOOD	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
ESBACH	2	1	½	½	½	1	3	3	3	2	3	2	1½	1½	1	1¼	1	1½	2½	1½	1
CASTS	−	−	+	+	+	+	+	+	−	+	+	+	+	+	+	−	+	+	+	+	+

DAY OF DISEASE	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
AMT. OF URINE	28	36	28	36	18+	34	38	40	45	50	40	38	34	51	42	38	38	39	42	40	35
pH.	5·0	6·0	4·5	5·0	5·0	5·0	5·0	5·0	5·0	5·5	5·5	5·0	5·0	5·5	5·0	5·5	5·5	5·0	5·0	5·0	5·0
ALBUMIN	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
BLOOD	+	+	+	+	+	+	+	+	−	+	+										
ESBACH	¾	¾	¾	¾	1	¾	½	½	¾	1	½	½	¼	½	¼	½	Tr.	¼	¼	¼	¼
CASTS	+	+	+	+	+	+	−	+	+	+	−	−	−	+	+	−	−	−	−	−	+

Continued overleaf.

DAY OF DISEASE	64	65	66	67	68	69	70	71	72	73	74	75	76	77
AMT. OF URINE	40	36	39	32	42	45	40	50	41	38	34	39		
p H.	5·5	5·0	7·0	5·5	5·0	5·0	5·0	5·0	5·0	5·0	5·0	5·0		
ALBUMIN	+	+	+	+										
BLOOD														
ESBACH	Tr.	Tr.	Tr.	Tr.										
CASTS	–	–	–	–	–	–	–							

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26. Catherine Russell. 3 years. Admitted 4th. day of disease. Scarlatina of average severity.

TABLE NO 54

DAY OF DISEASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AMT. OF URINE					16	22	31	28	33	27	26	29	25	33	30	24	29	31	30	27	22
p H.					5·0	5·0	5·0	5·0	5·0	5·0	5·0	5·0	5·0	5·0	5·0	5·0	5·0	5·0	5·0	5·5	5·0
ALBUMIN																					
BLOOD																					
ESBACH																					
CASTS																					

DAY OF DISEASE	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
AMT. OF URINE	35	21	30	28	24	27	30	21	19	24	20	16	22	25	28	30	17+	27	30	31	30
p H.	5·5	5·0	5·0	6·0	5·0	5·0	5·0	5·5	5·5	5·0	4·0	5·0	5·0	5·0	5·0	5·5	5·0	5·0	5·0	5·0	5·5
ALBUMIN								+	+	+	+	+	+	+	+	+	+	+	+	+	+
BLOOD								+	+	+	+	+	+	+	+	+	+	+	+	+	+
ESBACH								2	3	1	2	2	1½	1	½	¾	¼	1	¼	½	½
CASTS								–	+	+	+	+	+	+	+	+	–	–	–	–	–

Continued overleaf.

DAY OF DISEASE	43	44	45	46	47	48	49
AMT. OF URINE.	35	33	30	28	34	29	33
pH.	5·0	5·5	5·0	7·0	8·0	5·0	5·0
ALBUMIN	+	+					
BLOOD							
ESBACH	Tr.	Tr.					
CASTS	—	—	—	—	—		

27. James Sneddon. 5 years. Admitted Ist. day of disease. Scarlatina of average severity.

TABLE No. 55.

DAY OF DISEASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AMT. OF URINE		18	28	26	35	34	31	38	28	40	36	45	42	34	47	32	26	31	30	34	29
pH.		6·5	5·0	5·0	5·0	6·5	5·5	5·0	5·0	5·0	5·5	5·0	5·0	5·0	5·0	5·5	5·0	5·0	5·0	5·0	5·0
ALBUMIN																			+	+	+
BLOOD																					
ESBACH																			2	2	3
CASTS																					

DAY OF DISEASE	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
AMT. OF URINE	40	35	33	28	36	18	27	30	35	15	20	41	30	36	30	26	13	25	30	27	26
pH.	6·0	5·5	5·0	5·0	5·0	5·0	5·0	5·0	5·5	5·5	5·0	5·0	5·0	5·0	5·0	5·5	5·0	5·0	5·5	5·0	5·0
ALBUMIN	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
BLOOD							+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
ESBACH	4	2	2	1	½	¼	½	1½	1½	1½	2	1½	1	¾	¾	1	1	¾	¾	¾	½
CASTS							—	—	—	+	+	+	+	+	+	+	+	+	+	+	+

Continued overleaf.

DAY OF DISEASE	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
AMT. OF URINE	20	11	30	27	30	32	34	28	29	35	42	30	27	33	26	34	32	35	30	38	29
pH.	6·0	5·0	5·0	5·0	5·0	5·5	5·0	5·0	5·5	5·5	5·0	5·0	5·0	5·5	5·5	5·5	5·5	5·0	5·0	5·0	5·0
ALBUMIN	+	+	+	+	+	+	+	+	+	+	+	+									
BLOOD	+	+	+																		
ESBACH	¼	½	¼	Tr.	Tr.	½	¼	Tr.	Tr.	Tr.	Tr.	Tr.									
CASTS	+	+	+	+	+	+	−	−	+	−	−	−	+	−	−	−	−	−			

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28. John Kelly. 6 years. Admitted 8th. day of disease.

Scarlatina of average severity.

TABLE NO. 56.

DAY OF DISEASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
AMT. OF URINE								28	33	26	35	32	30		34	28	39	25	26	32	35
pH.								5·0	5·0	6·5	7·5	6·0	5·0		5·0	6·0	5·0	5·5	5·0	5·0	5·0
ALBUMIN															+	+	+	+	+	+	+
BLOOD															+	+	+	+			
ESBACH															2	1½	1½	½	½	½	¼
CASTS															−	−	−	−	−	−	−

DAY OF DISEASE	22	23	24	25	26	27	28	29	30	31	32	33	34	35
AMT. OF URINE	38	40	35	38	32	30	38	27	36	27				
pH.	5·0	5·0	5·5	5·0	5·0	6·5	6·0	5·0	5·0	5·0				
ALBUMIN	+													
BLOOD														
ESBACH	Tr.													
CASTS	−													

The main points from tables I4 to 56 are extracted in the next four tables - 57 to 60.

ALBUMINURIA.

TEST SERIES.

TABLE No. 57.

Case No.	Initials	Age in Years	Day of Occurence of Albuminuria	Duration of Albuminuria	* Severity	Effect on Amt. of Urine	Effect on pH. of Urine
1	C.A.	14	32 ND.	§ 3 Days +	Mild	Reduced	Nil
2	C.C.	4	26 TH.	4 Days	"	"	"
3	R.L.	6	32 ND.	9 "	"	Increased	"
4	J.R.	3	37 TH.	2 "	"	Reduced	"
5	M.C.	4	46 TH.	4 "	"	Nil	"
6	W.C.	2	10 TH.	9 "	"	?	Lowered

* Incases of Albuminuria the following standard was adopted in assessing Severity:-

MILD cases had at no time an Esbach of more than $\frac{3}{4}$.

MODERATE cases had at some time an Esbach of I or over.

§ Estimation of presence of albumin stopped because of menstruation. No albumin was present after menstruation stopped.

CONTROL SERIES.

TABLE No. 58.

CASE No.	INITIALS	AGE IN YEARS	DAY OF OCCURENCE OF ALBUMINURIA	DURATION OF ALBUMINURIA	* SEVERITY	EFFECT ON AMT. OF URINE	EFFECT ON pH. OF URINE
1	J.C.	4	31st.	17 Days	Mild	Increased	Nil.
2	C.C.	8	17TH.	3 "	"	Nil	"
3	S.B	4	19TH.	3 "	"	"	"
4	J.McC.	6	20TH.	8 "	"	Increased	"
5	G.I.	13	9TH.	3 "	"	Nil	"
6	R.C.	11	25TH.	5 "	"	"	"
7	S.T.	4	34TH.	3 "	"	"	"
8	E.S.	7	23RD.	6 "	"	"	"
9	D.A.	6	13TH.	5 "	"	Increased	"
10	R.C.	11	22ND.	11 "	Moderate	Decreased	"
11	A.R.	5	21st.	17 "	"	"	"
12	M.McP.	5	25TH	5 "	Mild	Nil	"
13	M.P.	4	16TH.	9 "	Moderate	"	"
14	T.D.	4	23RD.	8 "	"	"	"
15	B.F.	4	6TH.	10 "	Mild	"	"
16	H.McG.	8	27TH.	3 "	"	Decreased	"

NEPHRITIS.

TEST SERIES.

TABLE No 59.

Case No.	Initials	Age in Years	Time of Appearance of Albumin in Urine	Appearance of Blood in Urine	Duration of Haematoria	Duration of Casts in Urine	* Severity	Effect on Amt. of Urine	Effect on pH of Urine
7	H.M.	5	27th. Day.	28th Day.	5 Days	—	Mild	Decreased	7·0 on 3rd Day of Nephritis
8	B.L.	6	36th. "	37th. "	3 "	—	"	"	Nil.
9	S.D.	6	16th. "	20th. "	6 "	1 Day	"	Increased	6·5 on 4th Day of Nephritis
10	R.B.	9	23rd. "	27th. "	8 "	—	"	"	Nil.
11	R.M.	3	19th. "	20th. "	22 "	15 Days	Moderate	Decreased	Reduced after 8 Days of Nephritis
12	G.G.	7	16th. "	17th. "	23 "	13 "	"	"	Patients vomited Alkalies at onset of Nephritis
13	A.McL.	14	20th. "	22nd. "	18 "	14 "	"	"	
14	J.L.	11	16th. "	16th. "	3 "	—	Mild	Nil	Nil
15	N.H.	8	25th "	25th "	12 "	5 Days	"	Decreased	Reduced after 5 Days of Nephritis

* The severity of a case of nephritis was judged by considering the general clinical picture, amount of albumin and blood in the urine, and the presence and abundance of casts.

CONTROL SERIES.

TABLE NO. 60.

CASE NO.	INITIALS	AGE IN YEARS	TIME OF APPEARANCE OF ALBUMIN IN URINE	APPEARANCE OF BLOOD IN URINE	DURATION OF HAEMATURIA	DURATION OF CASTS IN URINE	SEVERITY	EFFECT ON AMT. OF URINE	EFFECT ON pH OF URINE
17	R.D.	5	30TH. Day	30TH. Day	14 Days	20 Days	Moderate	Nil	Nil
18	P.W.	4	26TH. "	34TH. "	5 "	—	Mild	"	"
19	G.P.	4	40TH. "	40TH. "	4 "	—	"	Decreased	"
20	A.D.	14	6TH. "	6TH. "	16 "	9 Days	"	"	"
21	M.McM.	3	19TH. "	19TH. "	6 "	3 "	"	Nil.	"
22	J.B.	7	19TH. "	26TH "	5 "	3 "	"	"	"
23	A.S.	6	20TH. "	28TH "	7 "	10 "	"	Decreased	"
24	J.D.	4	17TH. "	17TH. "	16 "	13 "	Moderate	"	"
25	J.R.	8	19TH. "	19TH. "	35 "	33 "	"	"	"
26	C.R.	3	29TH. "	29TH "	14 "	7 "	Mild	"	"
27	J.S.	5	19TH. "	28TH. "	18 "	18 "	Moderate	"	"
28	J.K.	6	15TH. "	15TH. "	4 "	—	Mild	Nil.	"

Comparison between the two series is more clearly shown by setting out the results in parallel columns. See Tables 6I and 62.

Table No. 6I.

ALBUMINURIA.

TEST SERIES	CONTROL SERIES
I. 6 Cases.	I6 Cases.
2. Only 2 Cases occurred during the administration of alkalies.	I4 cases occurred during the first 28 days of the disease, and only 2 after that period.
3. Average duration of albuminuria - 5.I7 days.	Average duration of albuminuria - 7.25 days.
4. All cases "Mild".	I2 cases "Mild". 4 cases "Moderate".
5. Amount of urine increased on advent of albuminuria in I case; unaffected in I case; reduced in 3 cases. (The remaining case being a child of 2 years old did not have the amount of urine measured.).	Amount of urine increased on advent of albuminuria in 3 cases; unaffected in I0 cases; reduced in 3 cases.
6. pH. of urine unaffected by albuminuria.	pH. of urine unaffected by albuminuria.

Table No. 62.

NEPHRITIS.

TEST SERIES	CONTROL SERIES
I. 9 Cases.	I2 Cases.
2. All cases accurred during the 3rd. and 4th. weeks of scarlatina.	IO cases occurred during the 3rd. and 4th. weeks, I case on the 30th. day, and I case on the 40th. day.
3. Average duration of haematuria - II days.	Average duration of haematuria - I2 - days.
4. Casts appeared in 5 (or 55.6 %) cases.	Casts appeared in 9 (or 75.0%) cases.
5. 6(or 67%) cases were "Mild". 3(or 33%) cases were "Moderate". No case was severe and renal failure was never threatened.	8(or 67%) cases were "Mild". 4(or 33%) cases were "Moderate". No case was severe and renal failure was never threatened.
6. Amount of urine slightly increased on advent of albuminuria in 2 cases; unaffected in I case; reduced in 6 cases.	Amount of urine slightly increased on advent of albuminuria in 0 cases; unaffected in 5 cases; reduced in 7 cases.
7. Effect on pH. of urine:- 3 cases became definitely acid on the 4th, 5th, and 8th, days of nephritis respectively, but on none was acidity maintained. In I case the pH. was 7.0 on the 3rd. day, but swung back to alkalinity next day. In 2 cases the pH. was unaffected, and in the remaining 2 cases vomiting of alkalies upset the observations.	The pH. was unaffected in all cases.

Tables showing ALL COMPLICATIONS and their TIME OF OCCURRENCE in the two series.

TEST SERIES.

TABLE No. 63.

COMPLICATION	1st. WEEK	2ND.	3RD.	4TH.	5TH.	6TH.	7TH.	8TH.	AFTER 8TH. WEEK	TOTAL
ALBUMINURIA		1		1	2	1	1			6
NEPHRITIS			6	2	1					9
OTITIS MEDIA	13	8	3	3	2	2	1	1		33
PURULENT RHINITIS	16	6	3	5	2	3	2	1		38
ADENITIS	20	18	16	12	4	1	1	2		74
ARTHRITIS	5	4	1	1						11
CARDIAC			(1 organic) 3	2		1				6
TONSILLITIS		2	2	1	1	1	1			8
PURPURA					1					1
TOTAL	54	39	34	27	13	9	6	4	Nil.	186

CONTROL SERIES.

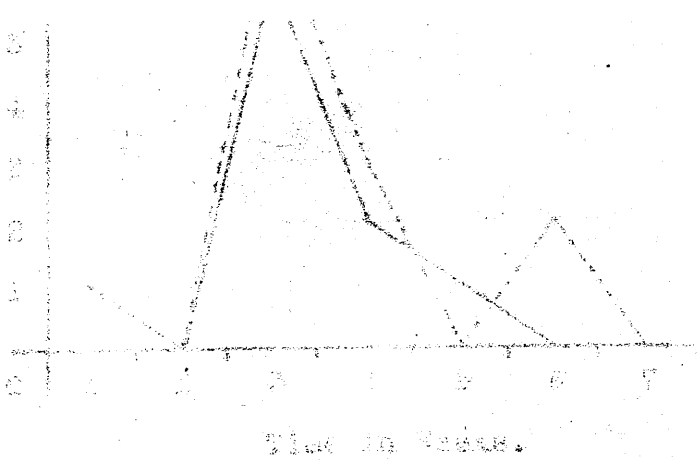
TABLE No 64

COMPLICATION	1st WEEK	2ND.	3RD.	4TH.	5TH.	6TH.	7TH.	8TH.	AFTER 8TH. WEEK	TOTAL
ALBUMINURIA	1	2	5	6	1	1				16
NEPHRITIS	1		7	3		1				12
OTITIS MEDIA	8	8	9	4	1	1				31
PURULENT RHINITIS	18	7	4	8	3	3	1		1	45
ADENITIS	24	27	22	8	6					87
ARTHRITIS	3 (? organic)	1	2 (one ? organic)							6
CARDIAC	1	2	2	1	1					7
TONSILLITIS	1	2	1	1		1				6
TOTAL	57	49	52	31	12	7	1	Nil.	1	210.

The cardiac complication marked "Organic" in Table 64 was in a case in which a rough crescendo presystolic murmur and thrill developed, and the patient had dyspnoea on exertion and a diminished exercise tolerance, all these signs persisting when the patient was discharged from hospital ten weeks after the appearance of the murmur.

The two cardiac complications marked "?Organic" in Table 64 were in cases which developed ventricular systolic apical murmurs transmitted to the axillae. No increase in cardiac dullness was at any time noted in either case. Both cases had slight dyspnoea on exertion but showed good exercise tolerance. It was impossible to be definite at the time of discharge whether these murmurs were due to transient dilatation of the mitral ring or to permanent incompetence of the valves.

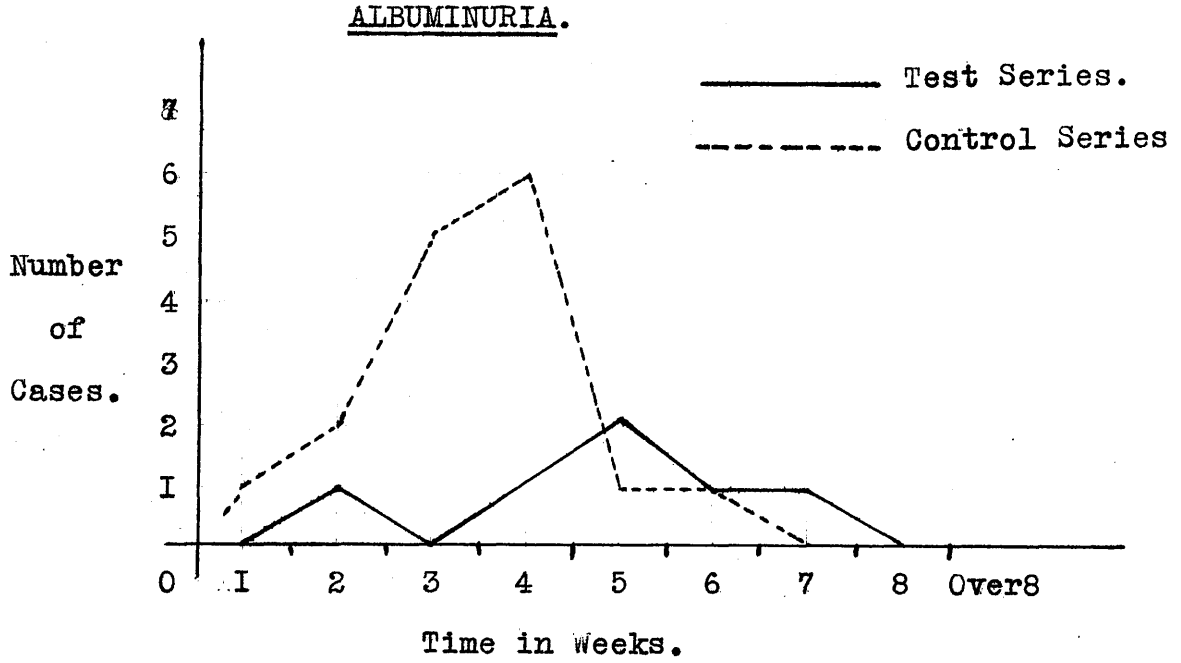
All other cardiac complications were transient ventricular systolic murmurs, and in all cases the patients left the hospital free from signs or symptoms referable to the heart.



Graphs showing INCIDENCE of COMPLICATIONS in each WEEK OF DISEASE in the TWO SERIES.

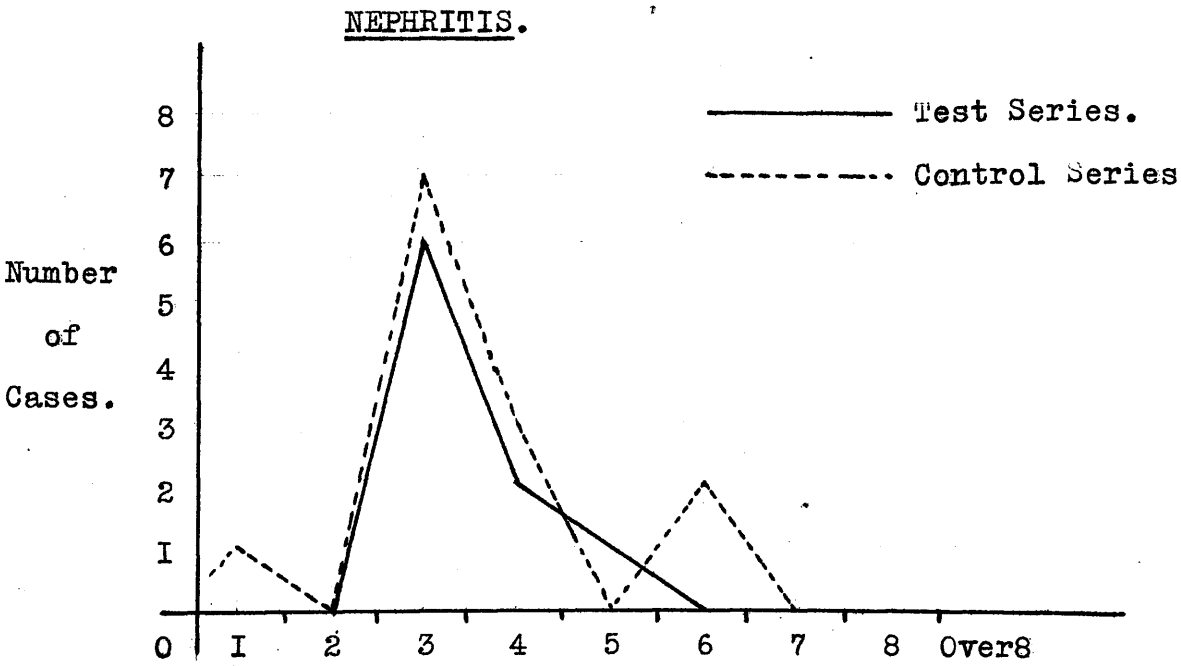
Graph No. 2.

ALBUMINURIA.



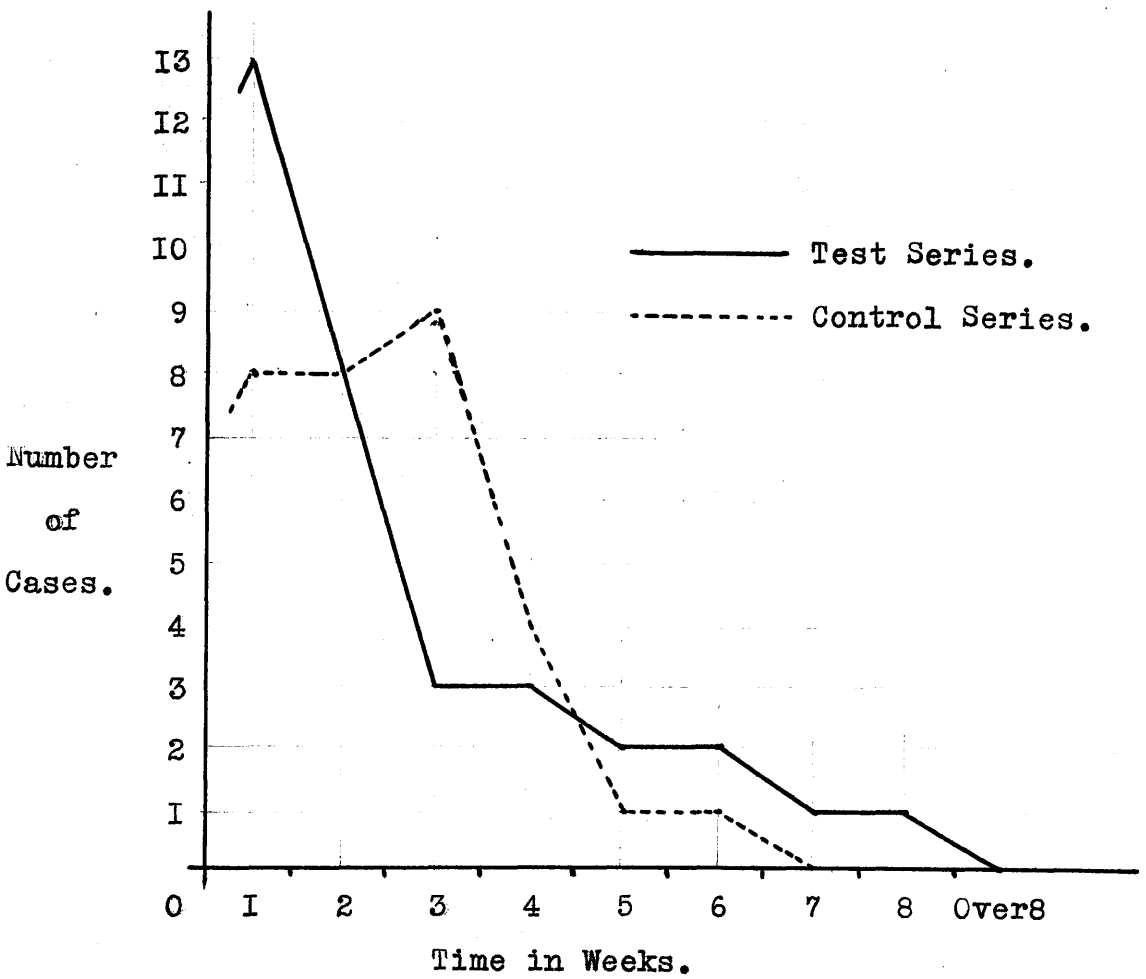
Graph No. 3.

NEPHRITIS.



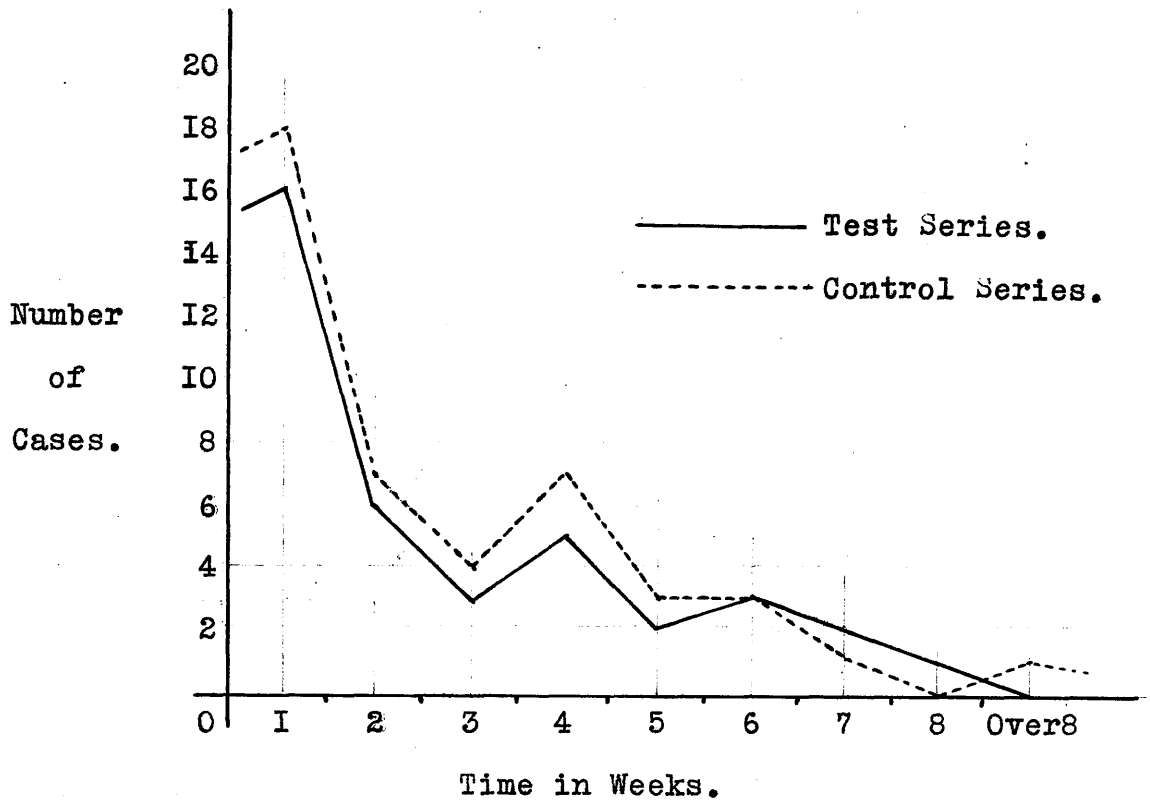
Graph No. 4.

OTITIS MEDIA.



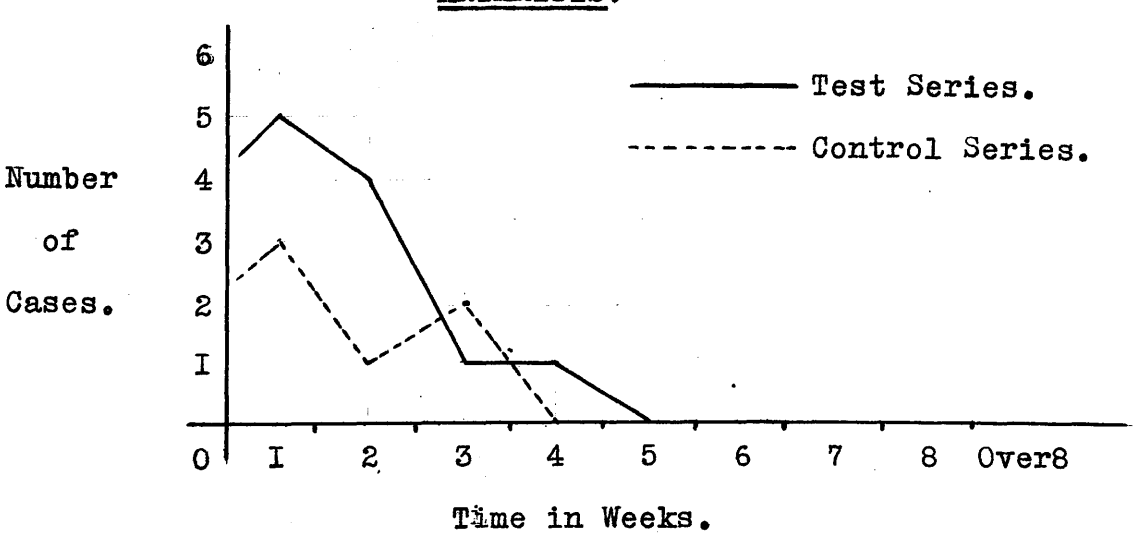
Graph No. 5.

PURULENT RHINITIS.



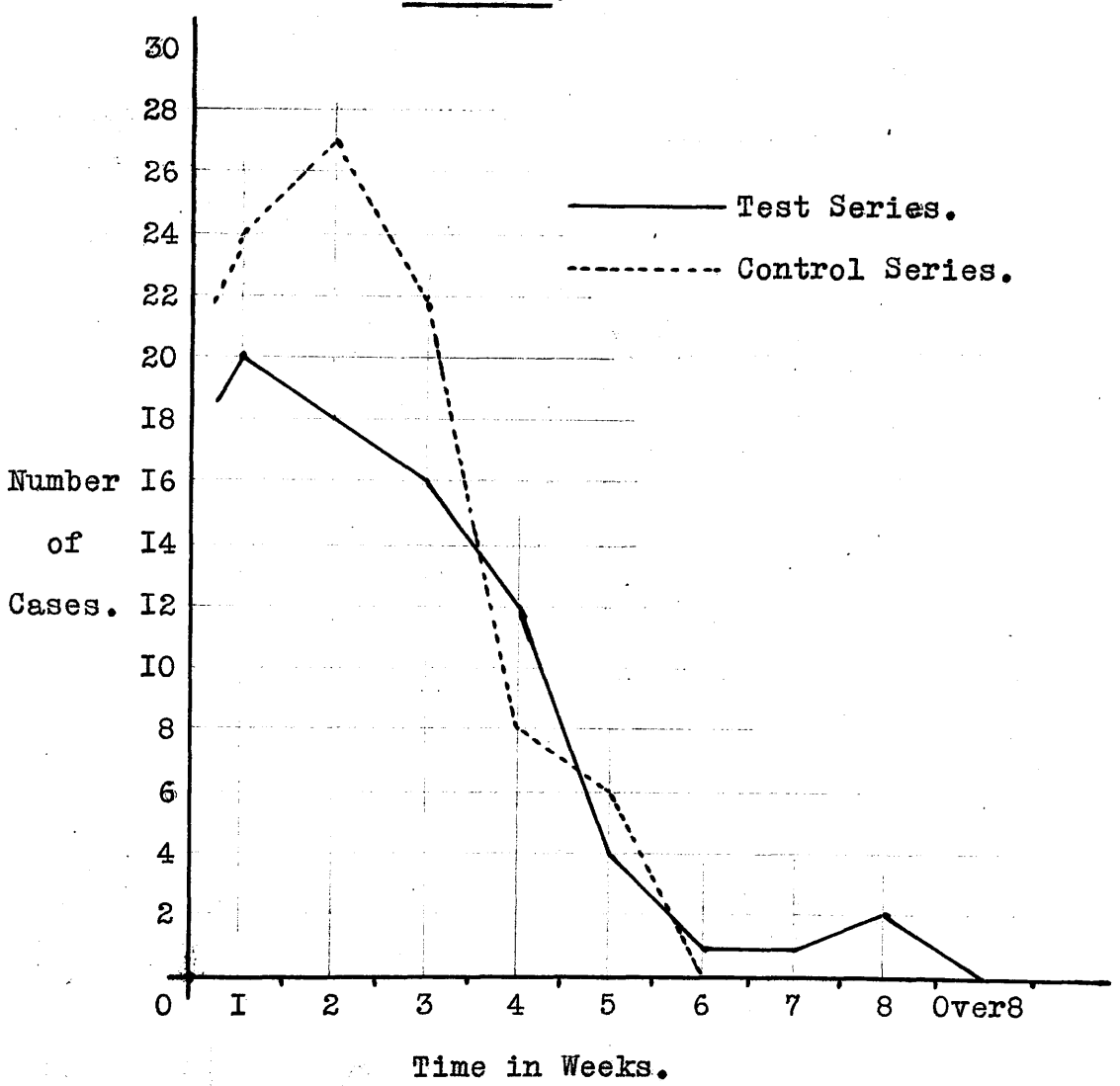
Graph No. 6.

ARTHRITIS.



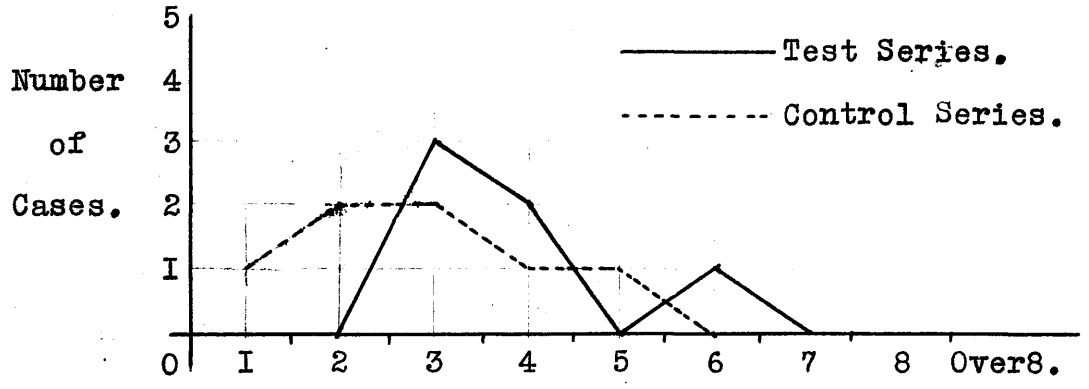
Graph No. 7.

ADENITIS.



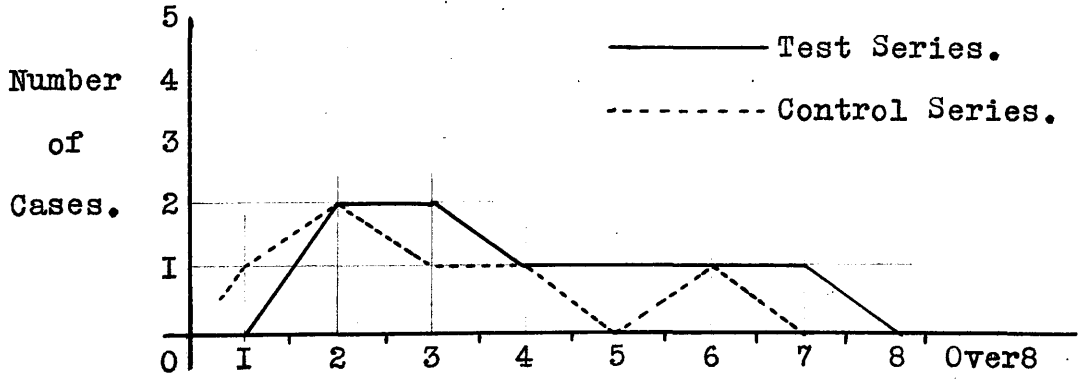
Graph No.8.

CARDIAC.



Graph No.9.

TONSILLITIS.



The tables and graphs show that complications were most frequent during the first week of the disease, and with one slight exception, diminished in frequency with each aucceeding week. (In the control series the figures for the third week - 52 - exceed those for the second week by 3.)

With the exception of albuminuria there was no obvious difference in the time of occurrence of the various complications in the two series. The numbers in some instances are too small to permit of trustworthy conclusions, but with the three most frequent complications, otitis media, purulent rhinitis, and adenitis the graphs show the similarity between the two series, while the distribution of arthritis, cardiac disease, and tonsillitis is sufficient to suggest that, given very large numbers of cases, the same similarity would be revealed.

Albuminuria occurred during the first four weeks (i.e. during administration of alkalies) in 2 (or 33%) of the 6 cases in the test series, while it occurred in 14 (or 87%) of the 16 cases in the control series.

In both series nephritis occurred during the classical period (viz. the third, and, less markedly, the fourth weeks) in practically all cases (see Tables 63 and 64, and Graph 3).

Table showing AGE INCIDENCE of ALL CASES, COMPLICATED CASES, and ALL COMPLICATIONS in BOTH SERIES.

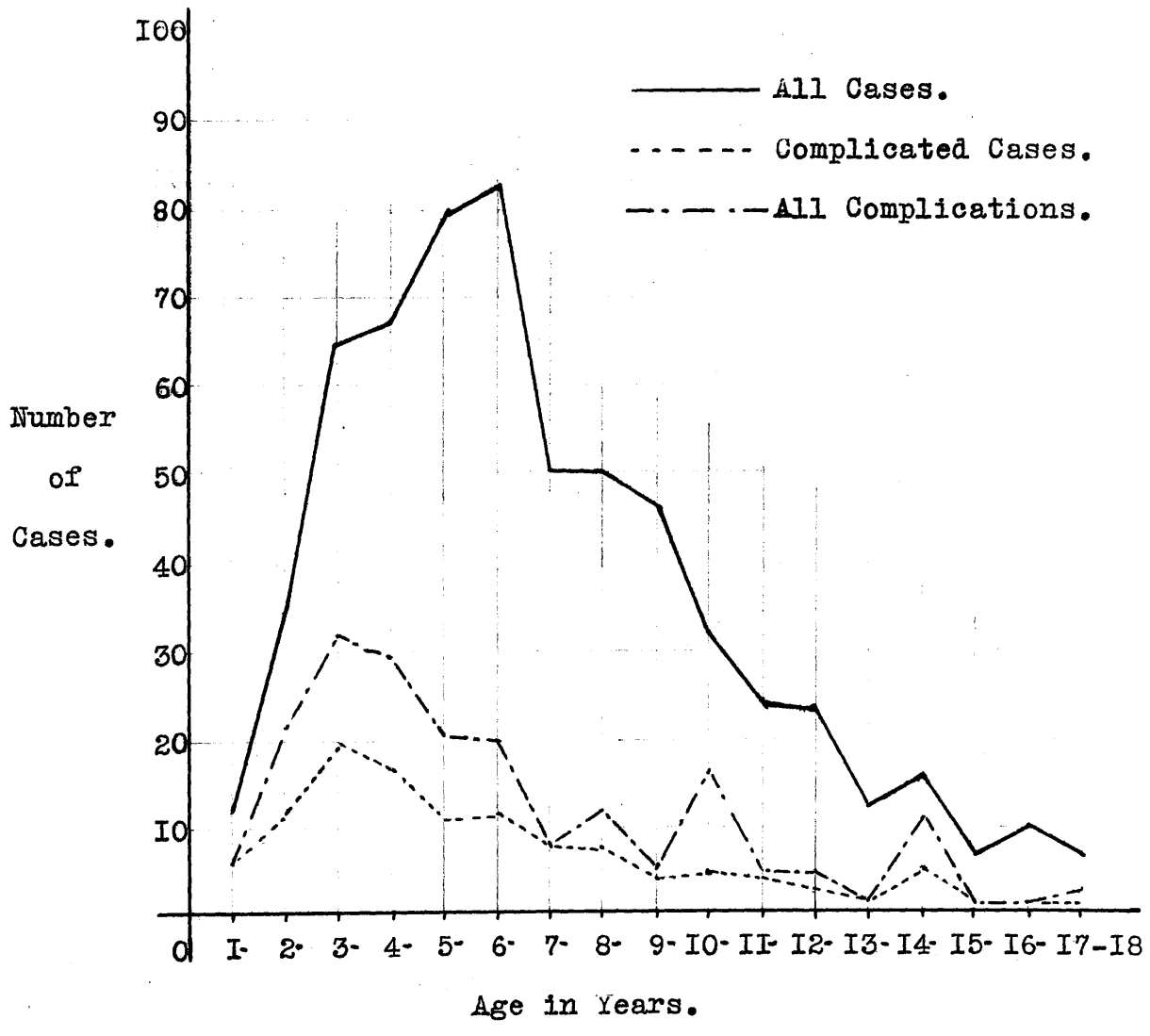
TABLE NO. 65.

AGE IN YEARS	TEST SERIES			CONTROL SERIES		
	ALL CASES	COMPLICATED CASES	ALL COMPLICATIONS	ALL CASES	COMPLICATED CASES	ALL COMPLICATIONS
1 -	12	6	6	14	9	13
2 -	35	12	22	32	15	27
3 -	64	20	32	61	20	34
4 -	68	17	29	72	23	37
5 -	79	11	21	84	14	24
6 -	83	12	20	77	12	15
7 -	50	8	8	58	8	10
8 -	50	7	13	49	8	11
9 -	46	4	5	42	4	8
10 -	32	5	16	36	4	6
11 -	25	3	4	28	1	3
12 -	24	2	4	19	1	2
13 -	12	1	1	14	4	7
14 -	16	5	11	7	5	7
15 -	6	1	1	11	1	2
16 -	10	1	1	10	3	3
17-18	6	1	2	4	1	1
TOTALS	618	116	186	618	133	210

Graphs showing AGE INCIDENCE of ALL CASES, COMPLICATED CASES and ALL COMPLICATIONS.

TEST SERIES.

Graph No. IO.



CONTROL SERIES.

Graph No. II.

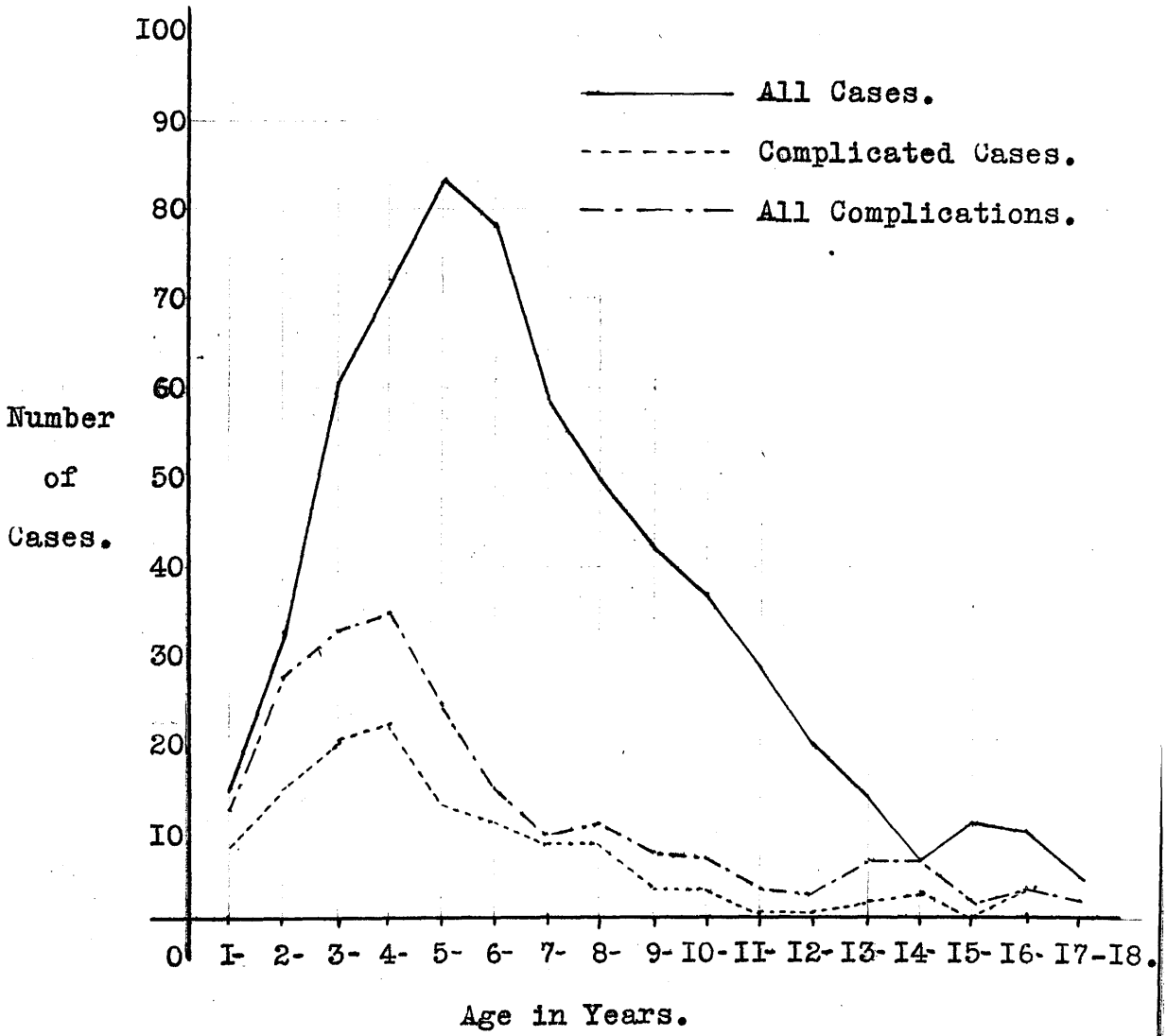


Table showing AGE INCIDENCE of COMPLICATED CASES and of INDIVIDUAL COMPLICATIONS.

TEST SERIES.

TABLE No. 66.

AGE IN YEARS	COMPLICATED CASES	ALBUMINURIA	NEPHRITIS	OTITIS	PURULENT RHINITIS	ADENITIS	ARTHRITIS	CARDIAC	TONSILLITIS	PURPURA	TOTAL COMPLICATIONS
1 -	6			1	3	2					6
2 -	12	1		3	7	10	1				22
3 -	20	1	1	8	5	12	2	1	2		32
4 -	17	2		7	8	10		1	1		29
5 -	11		1	4	5	10		1			21
6 -	12	1	2	3	4	8			1	1	20
7 -	8		1	1	3	2			1		8
8 -	7		1	3	1	6		1	1		13
9 -	4		1			4					5
10 -	5			1		5					16
11 -	3		1	1		1			1		4
12 -	2				1	1	2				4
13 -	1						1				1
14 -	5	1	1	1	1	3	3	1			11
15 -	1								1		1
16 -	1						1				1
17-18	1						1	1			2
TOTALS	116	6	9	33	38	74	11	6	8	1	186

Table showing AGE INCIDENCE of COMPLICATED CASES and of INDIVIDUAL COMPLICATIONS.

CONTROL SERIES.

TABLE No. 67.

AGE IN YEARS	COMPLICATED CASES	ALBUMINURIA	NEPHRITIS	OTITIS	PURULENT RHINITIS	ADENITIS	ARTHRITIS	CARDIAC	TONSILLITIS	PURPURA	TOTAL COMPLICATIONS
1 -	9			5	5	3					13
2 -	15			4	9	13			1		27
3 -	20		2	7	10	13			2		34
4 -	23	6	3	6	8	11	1	1	1		37
5 -	14	2	2	2	5	12		1			24
6 -	12	2	2	1	1	8			1		15
7 -	8	1	1	1	3	4					10
8 -	8	2	1	1	1	5		1			11
9 -	4				1	7					8
10 -	4			2	1	3					6
11 -	1	2				1					3
12 -	1					1			1		2
13 -	4	1				3	1	2			7
14 -	5		1		1	2	2	1			7
15 -	1			1			1				2
16 -	3			1			1	1			3
17-18	1					1					1
TOTALS	133	16	12	31	45	87	6	7	6	—	210

COMMENTARY ON THE EFFECT OF ADMINISTRATION OF ALKALIES.

I. General Condition of Patient.

During the first few days of scarlatina, while the disease was in its more toxic stage alkalies seemed to promote comfort and alertness. This effect was manifest from about 24 hours after commencement of alkalies. After the first few days no difference was noted between the two series.

2. Vomiting.

About one third of the children vomited immediately after the first three or four doses, but then became accustomed to the unpleasant mixture and swallowed it without protest or vomiting. In one case only did vomiting persist for seven days, at which stage alkalies were discontinued. In this case the child vomited immediately after each dose and the urine did not become alkaline, so that the possibility of vomiting being a sign of alkalosis did not arise. It was soon found, however, that vomiting among newly-admitted children could be greatly reduced by allowing them to see the more advanced patients take their medicine first.

3. Digestion.

Apart from the initial vomiting the digestive system did not appear to be upset in any way.

4. Heart.

Potassium salts in large amounts are depressants to all muscular tissue and decrease the force of the heart (38). In no case was this depressant action noted during my experiment.

5. Alkalosis.

Particular care was exercised in watching for early signs of alkalosis, but none were ever seen. In this

connection it ought to be noted that care would be necessary in giving alkalies to patients with an already impaired renal function, since it has been shown (39) that impaired renal function is an important aetiological factor in alkalosis.

6. Diuresis.

Diuresis was constantly induced throughout the test series, amounting to about 30 per cent. In younger children it was slightly greater than in older ones (see Table IO).

The most marked diuresis occurred in

(a). A boy of I6 years who passed 86 ozs.; I00 ozs.; I02 ozs.; II0 ozs.; 90 ozs.; I2I ozs.; and 8I ozs. each day from the 8th. to the I4th. days respectively.

(b). A girl of 4 years who passed 54 ozs.; 55 ozs.; 50 ozs.; 55 ozs.; 60 ozs.; 52 ozs.; and 55 ozs each day from the I5th. to the 2Ist. days respectively.

In neither case was there a complication, nor a history of chronic nephritis, diabetes or other factor that might give an abnormal renal output, and in both cases the output fell to within normal limits on stoppage of alkalies.

Diuresis was not noticeably affected by the supervention of complications except when

(a). the complication was a renal one (see Tables I4 to 56), or

(b). the complication was attended by marked pyrexia.

In no case where the temperature did not reach I02 deg. on at least one occasion was any decrease in diuresis noted. The four examples given in Table 68 (overleaf) illustrate this point and are representative of what was found throughout.

TABLE NO. 68.

INITIALS	AGE IN YEARS	DAY OF DISEASE 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
H.G.	7		15	50	42	47	54	50	42	50	48	47	57	46	54	54	54	40	53	44	52	54
I.A.	14						16	40	40	69	60	71	72	75	70	55	61	56	56	40	58	65
J.A.	3			20	31	33	26	31	35	21	17	21	27	29	23	34	30	26	22	25	29	32
T.M.	8			26	48	42	50	41	32	36	34	38	45	50	46	48	51	42	39	48	46	54

INITIALS	22	23	24	25	26	27	28	29	30	31	32	33	34	35
H.G.	52	44	52	43	44	49	46	56	48					
I.A.	56	60	62	52	60	55	56	50	50					
J.A.	31	28	34	32	21	31	28	30	24					
T.M.	56	50	47	54	51	47	55	52	54					

COMPLICATIONS.

Day of appearance +

Day when cleared up −

H.G. had adenitis from 16th. to 26th. day - highest temperature 100.0 deg. on 16th. day.

J.A. had arthritis from 8th. day to 11th. day - highest temperature 100.6 deg. on 8th. day.

In neither of these cases was the diuresis reduced on the supervention of the complication.

J.A. had otitis media from 9th. day to 24th. day - highest temperature 102.6 deg. on 9th. day, and remained above 101.0 deg. till 12th. day. - subsided on 13th. day.

T.M. had adenitis from 6th. day until the gland was incised on 12th. day; the highest temperature was 102.0 deg. on 7th. day, and temperature remained swinging from7th. day onwards, the evening temperatures being over 101.4 deg.

The amount of urine passed was definitely reduced in these two cases.

7. Reaction of Urine.

The early morning specimens of urine became alkaline after 24 or 48 hours and a pH. of 8.0 to 8.5 was maintained more or less constantly until 24 or 48 hours after the withdrawal of alkalies.

When a patient was acutely ill for longer than usual at the onset of the disease the urine sometimes took longer to reach the desired alkalinity as shown by the following representative table:-

TABLE No 69.

Initials	Age in Years	Day of Disease 1	2	3	4	5	6	7	8	9	10	11
J.T.	8			5·0	6·0	5·5	6·5	7·5*	8·0	8·5	8·5	8·0
A.S.	4				5·0	5·0	6·5	5·0*	8·0	8·5	8·0	8·5
T.D.	11		4·5	5·5	5·0	6·5	8·5	8·0*	8·5	8·5	8·5	8·5
F.H.	14			5·5	5·0	5·5	8·0	8·5*	8·5	8·0	9·0	8·5

* Day that temperature subsided.

While these general rules held there were many slight, irregular, unexplained, variations. Reference to Tables I2 to 56 shows that many cases gave one or more acid reading during the experiment, and these could not be explained by the clinical condition of the patients, and showed no constant relationship to complications.

Only severe septic, and renal complications caused a definite and retained swing to acidity of the urine.

8. State of the Buttocks in Infants.

Among the young children who were still wearing napkins

no case of erythema of the napkin area occurred while they were having alkalies, and the nursing staff reported that it was not necessary to take the usual care to prevent it.

CONCLUSIONS.

(I) A return of a more severe form of scarlet fever, accompanied by an increase in the incidence of scarlatinal nephritis, is to be expected in this country.

(2) Several methods of preventing scarlatinal nephritis have been suggested, the most important of these being the administration of large doses of alkalies.

(3) The results published by previous workers on alkaline therapy have been contradictory. Insufficient care was taken in some of the experiments to ensure that the cases used as controls were in all respects strictly comparable to the test series. Other workers used too few cases, and their results were, therefore, of limited value. There is no agreement as to the dosage of alkalies, or the period during which they ought to be administered.

(4) Albuminuria was reduced from I6(2.49 per cent.) to 6(0.97 per cent.) cases by the use of alkalies in the present experiment. The most marked feature of this reduction was that only 2 cases developed albuminuria while receiving alkalies, but of the I6 cases in the control group, I4 occurred during the first 28 days of the disease. Albuminuria was, on the average, definitely milder in the alkali-treated cases (see Table 6I), and was of shorter duration (5.I7 days, as against 7.25 days).

Since albuminuria is a transient and apparently harmless complication of scarlet fever its reduction is of scientific interest only, but of no practical importance.

(5) Nephritis was reduced from I2(I.94 per cent.) to 9(I.46 per cent) cases. This reduction is too small to be of practical significance, especially as the percentage of

mild, moderate, and severe nephritis was the same in both series, and the time of its occurrence unaffected by alkalies.

(6) The numbers, age incidence, and time of occurrence of the other common complications of scarlatina were unaffected by administration of alkalies.

(7) Complications in scarlet fever are commoner in young children than in older ones. This is due to the preponderance of septic complications at the ages of three and four years. In both series complications were most numerous at these ages, although the highest incidence of scarlet fever was at the ages of five and six years.

(8) Administration of antitoxic serum does not appear to have diminished the incidence of renal complications in scarlet fever.

(9) (a)Thyreoid extract and Tincture of Iodine, and (b)Urotropine, have also been recommended as prophylactics against renal complications, but have not been successful.

(IO) A reliable method of preventing renal complications in scarlet fever has yet to be found.

SUMMARY.

(I) An examination of evidence showed that a return of a more severe form of scarlet fever is to be expected in this country, and that this will probably be accompanied by a rise in the incidence of scarlatinal nephritis.

(2) Several methods of prophylaxis against scarlatinal nephritis have been suggested. The one which has attracted most attention is the administration of large doses of alkalies.

(3) Several workers have tried this method, but their conclusions show little agreement.

(4) I set out to test the clinical value of the method in a strictly controlled series of cases, in order to define the true place of alkalies in the treatment of scarlet fever.

(5) Two series of cases were studied:-

(a) Test Series - 618 cases. Patients in this series received sufficient alkalies to keep the early morning urine at a pH. of near 8.3 for the first 28 days of the disease.

(b) Control Series - 618 cases. These cases received no alkalies. In all other respects they received similar treatment to the cases in the test series.

When serum (antiscarlatinal or diphtheria antitoxin) was considered advisable it was given to patients in either series.

Care was taken to assure the greatest possible similarity between the series.

(6) In the test series there occurred 6 cases of albuminuria and 9 cases of nephritis.

In the control series there were I6 cases of albuminuria and I2 cases of nephritis.

Albuminuria was, on the average, milder among the alkali-treated cases, while the same percentages of cases of nephritis fell into the various grades of severity in each series.

Owing to the benign nature of albuminuria its lowered incidence in the test series is unimportant, and the reduction of nephritis from I2 to 9 cases is insufficient to prove benefit from alkalies.

(7) Other interesting points relating to the complications of scarlet fever were brought out in the course of the investigation - viz. (a) that complications are commoner in younger than in older children, and (b) septic complications are most numerous at the ages of 3 and 4 years.

(8) A reliable method of preventing renal complications in scarlet fever has yet to be found.

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