with positive results of a prolongation of the average life of maize-meal-eating guinea-pigs. In the light of the new ideas of McCollum I venture to say that with my alcoholic extracts (made with acidulated alcohol at 37°) I partly supplemented the fat-soluble factor A, which is certainly lacking in all cereal grains and in maize meal too, and is abundant in all leaves. Lately, Osborne and Mendel¹⁹ have found in cabbage a lack of water-soluble vitamin B, and therefore in alcoholic extract we may assume that factor A is present.

I tried also to supplement maize meal with alcoholic extract of maize bran, but to no purpose; this again shows that the active substance of alcoholic extracts of cabbage leaves is something which is present neither in maize meal nor in maize bran—that is, something lacking in the whole cereal grain, in the endosperm as well as in the aleuronic layer and embryo; this is the case with factor A, while factor B must be present in good bran with much of the outer layers and embryos of the seed.

I can also state that alcoholic extracts of liver (fresh liver of healthy guinea-pigs) prolonged the life of maize-meal-eating guinea-pigs a little; the active substance was present in animal organs too. This may perhaps be compared with the experiments of Osborne and Mendel, who found the liver, heart, and kidney (of pigs) very rich in growth-promoting vitamin for rats,²⁰ and of Eddy, who isolated a growth-promoting substance from sheep's pancreas. Thus I came to the conclusion that in animal organs and in the green parts of plants there must be some alcohol-soluble body which diminishes the harmful action of maize diet on guinea-pigs; but with the means at my disposal I could go no further in my analysis.

It is well to remember, too, that I found a diminution of adrenalin in the suprarenal glands of maize-eating animals, using the biological method of Fraenkel (action of suprarenal glands ground up and suspended in saline solution on the uterus of virgin rabbits, and registration of the contraction of the muscular organ); contrary to the results of experiments by McCarrison on pigeons fed on polished rice, pointing to an increase of adrenalin. The difference may be attributed to the different conditions of experimental work and of diet and to the zoological remoteness of the animals used. My work on the etiology of pellagra did not produce conclusive results, but it has established certain facts which may be important in the etiology and pathogenesis of maidism in guinea-pigs and of pellagra in man. I do not assume the identity of these two conditions; the differences are obvious, but there are some resemblances too. It is a fact that maidism is an experimental deficiency disease due to the lack in maize of the elements necessary to maintain animals. McCollum, Simmonds, and Parsons²¹ do not look upon pellagra as a real avitaminosis in the sense used by Funk and do not recognize a pellagra vitamin, but still they maintain that the experimental symptom-complex obtained by Chittenden and Underhill in dogs is to be attributed to protein factors, partly to lack of factor A and of salts. For the maidism of guinea-pigs we may still admit a complicated deficiency of maize meal, and we may state that green vegetables and fresh animal organs contain corrective substances. Maidism, at any rate, has features which I think separate it from simple starvation and from typical scurvy.

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AT the commencement exercises of the New York University and Bellevue Hospital Medical College it was announced that the institution would in future admit women and would grant them the degree of M.D. on the same terms as men.

A Collective Investigation OF TEN THOUSAND RECRUITS WITH DOUBTFUL HEART CONDITIONS.

Conducted at the National Hospital for Diseases of the Heart by C. CHAPMAN GIBBS, R. O. MOON, S. RUSSELL WELLS, P. HAMILL, FREDERICK W. PRICE, and J. STRICKLAND GOODALL.

REPORT III.*

COMPILED BY

S. RUSSELL WELLS, M.D., B.Sc.

THE ETIOLOGY OF AORTIC REGURGITATION.

Syphilis.

Of the 307 cases 11 gave a history of syphilis, but in no less than 7 of these there was a definite history of rheumatic fever, and of the remaining 4, the first, a carman aged 39, had had a fever of a doubtful nature which may have been acute rheumatism, and presented definite signs of mitral stenosis and regurgitation as well as of aortic regurgitation; his syphilis had been acquired 36 years before examination. The second was a man of 30 years of age, who said he had had rheumatism, which he described as "muscular," but which laid him up for three months when he was 28; as, however, he stated he had had gonorrhoea no less than eight times, the true rheumatic nature of the affection must at least be regarded as doubtful, probably it was gonorrhoeal rheumatism. The third, aged 34, gave no history of illness beyond his syphilis five years ago, except scarlet fever; he showed signs of mitral regurgitation which was probably secondary, as he had albumin in his urine and other signs of failing circulation. The fourth, a man of 30, gave no history of any illness other than syphilis four years ago except tonsillitis eight years before, and influenza. He was classified as pure aortic regurgitation. Thus, out of the 11 cases, in 4 at the most, that is, 36.4 per cent., and possibly in only 3 (27.3 per cent.), can syphilis alone be credited with being the cause of the aortic regurgitation.

TABLE XIII.—Comparing all the Cases of Aortic Regurgitation dealt with, with those giving a Syphilitic History.

	No. of Cases.	With Rh. Fever.	With Rh. G.P., or Ch	Without Rh. History
Total Ao. R. ...	307	162=52.8%	73=23.8%	72=23.4%
Ao. R. and syphilis ...	11	7=63.6%	1=9.1%	3=27.3%

Making due allowance for the small numbers involved in the case of syphilis, the percentages are very similar. This suggests that the coincidence of syphilis and aortic regurgitation in the three or four cases where there was no definite history of rheumatic fever may be fortuitous. It may be objected that we are dependent in these cases upon the man's word alone for a history of syphilis, and that frequently its presence has been concealed. No doubt it would have been better, had it been possible, to have determined the Wassermann reaction in every case. This, of course, was impracticable, but, as has been pointed out in a previous report, by reason of the exceptional circumstances of these examinations there was far less likelihood of concealment than usual. Moreover, the results quite confirm the impressions gained on taking the Wassermann reaction of a series of hospital out-patients suffering from aortic regurgitation.

Ratio of Pure to Mixed Lesions.—We may record, for what it is worth, the fact that the proportion of pure aortic to mixed lesions is higher in the syphilitic cases than in the total aortic regurgitants with a history of rheumatic fever—that is, 1.2 as against 0.76. Of the syphilitic cases without a definite history of rheumatic fever 2 were pure aortic and 2 mixed lesions. Very little importance can be attached to these figures, as the number of syphilitic cases is too small.

It will be seen that the investigation of these cases leads to the conclusion that syphilis is not of much importance as a cause of aortic regurgitation in the case of men

* Concluded from p. 514.

between the ages of 18 and 41—first, because only 3.6 per cent. of the cases with aortic regurgitation gave any history of syphilis, and secondly, because of this 3.6 per cent. 63.6 per cent. gave a history of rheumatic fever—a figure quite comparable with the percentage of total aortic regurgitants giving a like history.

Gonorrhoea.

In 16 cases out of the 307 there was a history of one or more attacks of gonorrhoea. In 10 of the 16 cases there was a definite history of rheumatic fever, 4 gave histories of rheumatism, one being the doubtful one referred to above under syphilis; another, a labourer aged 40, stated that he had been in hospital twice as a child, at an interval of about two years, for rheumatism, but his statements were too vague for these illnesses to be classified definitely as rheumatic fever; in the third there was no history of the man being confined to bed with his joint pains; the fourth gave a history of rheumatic attack lasting six weeks. Two cases gave a history of gonorrhoea and none of rheumatism; one of these, a mechanic aged 29, had resided in the Philippine Islands, and had had scarlet fever at 5 and dengue at 28; he had thickened and tortuous arteries, and was a case of pure aortic incompetence; the other, a cobbler aged 37, gave no history of any other illness, except pneumonia a year before—he was classified as aortic regurgitation and mitral regurgitation, the latter being probably secondary.

Hence, in 10 of these cases rheumatic fever may safely be said to have occurred, and there is a possibility of rheumatism in at least three and possibly four more; that is to say, 81 per cent. gave a history of rheumatic fever and its allies, and only 19 per cent. that of gonorrhoea apart from rheumatism; or, if we count the doubtful case as rheumatism, 87.5 per cent. and 12.5 per cent. respectively.

TABLE XIV.—Gonorrhoea.

	No. of Cases.	With Rh. Fever.	With R. Rh. Fever.	Without Rh. History
Total Ao. R.	307	162=52.8%	73=23.8%	72=23.4%
Ao. R. and gonorrhoea	16	10=62.5%	4=25.0%	2=12.5%

Ratio of Pure to Mixed Lesions.—Seven showed evidence of lesions of the aortic valves alone, while in 9 there was mitral involvement as well. This is a ratio of 0.7, which is practically the same as the 0.76 found for the 162 cases with a history of rheumatic fever. Of the 6 cases of gonorrhoea without a history of rheumatic fever, 3 were pure aortic lesions and 3 mixed, a ratio of 1, so there is a slight preponderance of pure aortic lesions here as in the case of syphilis, but the numbers are too small for any argument to be based upon them.

The analysis of these cases afforded little or no support to the view that gonorrhoea is an efficient cause of aortic regurgitation.

As Table XV shows, whether we consider as having a rheumatic history only those cases with a definite history of rheumatic fever, or whether we take as rheumatic those giving a history of either rheumatic fever, "rheumatism," growing pains, or chorea, the proportion showing a history of rheumatism is so large that we may neglect tonsillitis, scarlet fever, diphtheria, pneumonia, influenza, syphilis, and gonorrhoea as important causes of aortic regurgitation.

TABLE XV.—The Importance of Rheumatic Affection.

	Percentage with History of Rh. F.	Percentage with History of R., G.P., C.	Percentage with History of R.F., R., G.P., C.	Percentage without any Rheumatic History.
Total Ao. R.	52.8	23.8	76.6	23.4
Ao. R. and tonsillitis ...	66.6	11.7	78.3	21.7
.. and scarlet fever	63.4	18.3	81.7	18.3
.. and diphtheria ..	68.2	22.7	90.9	9.1
.. and pneumonia...	60.0	10.0	70.0	30.0
.. and influenza ...	57.7	21.8	79.5	20.5
.. and syphilis ...	63.6	9.1	72.7	27.3
.. and gonorrhoea.	62.5	25.0	87.5	12.5

With regard to the relation of pure to mixed lesions in the different affections, the following table shows that in the case of "rheumatism," chorea, tonsillitis, scarlet fever, pneumonia, and influenza, there is a tendency for cases giving these histories to show a preponderance of mixed lesions as compared with pure aortic lesions. This preponderance is due to many of these cases exhibiting an apical systolic murmur as well as the murmurs associated with aortic trouble, and rather suggests that while none of these diseases are answerable for damage to the aortic valves, it is possible that they may have some relation to the production of the apical systolic murmur. The numbers are, however, small, and we do not wish at the present stage to draw any definite deductions from them.

TABLE XVI.—Ratio of Pure Aortic to Mixed Lesions.

	Total.	Pure to Mixed Lesions.	Ratio.
Rheumatic fever	162	70 : 92	0.76
"Rheumatism" without R.F. ...	38	14 : 24	0.58
Growing pains	36	15 : 21	0.71
Chorea	10	3 : 7	0.43
Tonsillitis	20	6 : 14	0.43
Scarlet fever	26	8 : 18	0.4
Diphtheria	7	4 : 3	1.3
Pneumonia	6	2 : 4	0.5
Influenza	60	21 : 39	0.5
Syphilis	4	2 : 2	1.0
Gonorrhoea	6	3 : 3	1.0

Since the number of cases of aortic regurgitation with a history of rheumatic fever bear so large a proportion to the total number of aortic regurgitants, it is obvious that they may swamp the other causes in calculating the correlation. It was therefore thought wise to calculate the coefficients of correlation in a universe of discourse from which a history of rheumatic fever had been excluded. Of our 10,000 cases, 1,921 gave a history of rheumatic fever, and of our aortic regurgitants 162 gave a like history. This gives us a universe of 8,079 cases, 145 of which showed signs and symptoms of aortic regurgitation.

TABLE XVII.—Showing the Correlation between Aortic Regurgitation and the Various Suggested Etiological Factors, with the Numbers on which the Calculations are Based.

A.	B.	Number of Cases.				Coefficient of Correlation.	Limit of Error.	χ^2 .
		History of A. and B.	History of A. only.	History of B. only.	No History of A. or B.			
A. R.	"Rheumatism"	38	107	1,309	6,625	0.175	0.022	9.66
"	Growing pains	36	109	2,050	5,884	0.018	0.022	0.076
"	Chorea ...	10	135	154	7,780	0.203	0.021	17.58
"	Tonsillitis ...	20	125	1,665	6,269	0.165	0.021	4.46
"	Scarlet fever ...	26	119	1,680	6,254	0.067	0.022	0.899
"	Diphtheria ...	7	138	551	7,383	0.085	0.022	0.992
"	Pneumonia ...	8	137	432	7,502	0.002	0.022	0.001
"	Influenza ...	60	85	4,349	3,585	0.210	0.021	10.36
"	Syphilis...	4	141	141	7,793	0.065	0.022	0.778
"	Gonorrhoea ...	6	139	436	7,498	0.060	0.022	0.507
"	Strain ...	84	61	2,269	5,665	0.433	0.018	59.35

A. = Aortic regurgitation. B. = Etiological factor under consideration—for example, rheumatic fever, chorea, or the like.

An inspection of Table XVII shows that on account of the low values of χ^2 in the other cases, the only correlation coefficients worthy of consideration are those for "rheumatism," chorea, influenza, and strain. In the cases of influenza, chorea, and "rheumatism" the correlation is low, but there is moderate correlation between

aortic regurgitation and strain. It is not a little remarkable that while the correlation between rheumatic fever and aortic regurgitation is 0.499 ± 0.015 , if rheumatic fever is excluded, the correlation coefficient between aortic regurgitation and strain should be as high as 0.433 ± 0.018 while χ^2 is 59.35.

Age Incidence of Aortic Regurgitation.

It is generally considered that the incidence of aortic regurgitation increases with advancing years. The material with which this investigation is concerned being limited roughly to the years between 16 and 41 does not afford an opportunity for investigating those changes which occur in the latter stages of middle life and in old age. Still, it may be of some interest to tabulate the age incidence in that portion of life with which we are concerned.

TABLE XVIII.—Comparing, with Grouping in Quinquennial Periods, the Total Number of Recruits Examined, with the Total Number of Aortic Regurgitants found in each Quinquennium, omitting Cases below 17 and over 41 years of age.

	17-21	22-26	27-31	32-36	37-41
Total recruits examined ...	2103	203	2307	2114	1413
Aortic regurgitants ...	72	62	75	57	38

Since the number of cases examined in the different quinquennial periods was different, the percentages of the total aortic regurgitants in any quinquennium does not give a true estimate of the age incidence. For instance, 75 of the total 307 cases occurred in the quinquennium 27-31, while only 38 were seen whose ages were between 37-41. This great difference is, however, accidental, because 2,307 of the total 10,000 cases occurred in the quinquennium 27-31, and only 1,413 in the quinquennium 37-41. It is therefore obvious that the numbers in any period must be contrasted with the total number of cases examined belonging to that period rather than with the total of the particular lesion. Table XIX gives such a comparison:

TABLE XIX.

	Total Recruits Examined.	Total Aortic Regurgitants.	Ao. R. with no History suggestive of Rheumatism.
Ages 17 to 21 ...	2103	72=3.4%	17=0.8%
Ages 22 to 26 ...	2023	62=3.1%	12=0.6%
Ages 27 to 31 ...	2307	75=3.3%	16=0.7%
Ages 32 to 36 ...	2114	57=2.7%	16=0.7%
Ages 37 to 41 ...	1413	38=2.7%	10=0.7%

It will be noted that there is on the whole a decline in the incidence of aortic regurgitation between the years 17-41. This strongly suggests a cause, or causes, acting early in life, which either cease before middle life is approached or have a steadily decreasing incidence with advancing years. Rheumatic fever suggests itself as one such cause, for it is generally admitted that the incidence of rheumatic fever declines as middle life is approached, and an examination of the detailed analysis confirms this, as the decline in incidence applies to the cases giving a rheumatic history rather than to those without any history of rheumatism.

Cause in Cases without a History of Rheumatism.

The question now arises, what was the causal agent in the 72 cases where there was no history of rheumatism? It is possible that these men may have had rheumatism, which, because it occurred early in life, they may have forgotten, or which was not recognized because it was so slight. Before reaching such a conclusion, every other suggested cause should, so far as possible, be eliminated, and, since physical strain, alcohol, and tobacco have been regarded as such causes, it was thought well to investigate the occupations and habits of these cases of aortic regurgitation.

Since it is safer to base our conclusions on cases with definite histories, we shall divide the 307 into three groups:

- I. 162 with definite history of rheumatic fever.
- II. 73 with history of "rheumatism," growing pains, or chorea, where the rheumatic origin of the aortic regurgitation must be considered doubtful.
- III. 72 cases where there was no rheumatic history.

Alcohol and Tobacco.—A careful scrutiny of the histories as to tobacco and alcohol fails to reveal even a suggestion of any connexion between excess in these stimulants and aortic regurgitation. The results as to strain, however, were far more fruitful.

Strain.—Arranging the cases of aortic regurgitation according to their occupations alone, we find that 158 were in employments involving light muscular labour, 100 in the medium and 49 in the heavy groups.

TABLE XX.—Giving a Comparison between the Percentages in each Occupational Group of the Aortic Regurgitants with the Total 10,000 Recruits examined.

	Occupations.		
	Light.	Medium.	Heavy.
10,000 recruits ...	58.0 %	26.5 %	15.5 %
Total Ao.R. ...	51.5 %	32.5 %	16.0 %

This shows no striking difference between the distribution of occupations in the total number of recruits and that in the aortic regurgitants, beyond, possibly, a tendency in favour of medium labour rather than light. When, however, we divide the aortic regurgitants into groups according to their history of previous illness, more interesting facts come to light.

Taking first the 162 cases giving a history of rheumatic fever, 91 were in light occupations, 5 in medium, and 16 in heavy.

TABLE XXI.—Comparing on a Percentage Basis the Total Rheumatic Cases and Number of Recruits seen.

	Occupations.		
	Light.	Medium.	Heavy.
10,000 recruits ...	58.0 %	26.5 %	15.5 %
Ao. R. with history of rheumatic fever	56.8 %	33.3 %	9.9 %

Here there has obviously been a drift from the heavy occupations into those entailing only medium muscular exertion.

Taking the cases with a doubtful rheumatic history—that is to say, the 73 who gave an account of previous "rheumatism," growing pains, or chorea, it was found that 33 were in light occupations, 22 in medium, and 18 in heavy.

TABLE XXII.—Percentage Comparison: Doubtful Rheumatism.

	Occupations.		
	Light.	Medium.	Heavy.
10,000 recruits ...	58.0 %	26.5 %	15.5 %
Ao.R. with "rheumatism," growing pains, or chorea	45.3 %	30.1 %	24.6 %

Here the medium and heavy employments bulk larger than in our standard of comparison. There has certainly been no drift into the lighter occupations, and the numbers even suggest that the strenuous work may have been an etiological factor.

An investigation of the 72 cases of aortic regurgitation who gave no history of either "rheumatism," growing pains, or chorea, furnishes a comparable result; 33 were in light occupations, 24 in medium, and 15 in heavy.

TABLE XXIII.—No History of Rheumatism.

	Occupations.		
	Light.	Medium.	Heavy.
10,000 recruits ...	58.0 %	26.5 %	15.5 %
Ao.R. without rheumatic history...	45.8 %	33.3 %	20.9 %

But while occupation is a fair guide as to the strenuousness of a man's work, according to our former definition, it cannot be properly used when discussing the incidence of strain. A man may be subjected to muscular strain either as a result of his work or his amusements. The dock labourer and the blacksmith, for instance, are obviously perpetually undertaking heavy physical exertion, but the clerk, whose business hours are passed in sedentary employment, may, in his spare time, be undertaking heavy physical work in the form of football, rowing, or other athletic exercises. As in every case the amount and character of the exercise in which the recruit was in the habit of indulging is recorded, it has been possible to tabulate these cases under the headings of light, medium, and heavy exercise, the classification depending in some cases on the man's employment, and in some on his games.

TABLE XXIV.—Aortic Regurgitants with History of Rheumatic Fever.

Lesions.	Exercise.		
	Light.	Medium.	Heavy.
Aortic regurgitation alone ...	28	19	9
Aortic regurgitation and aortic stenosis ...	7	5	2
Aortic and mitral regurgitation ...	30	11	12
Aortic and mitral regurgitation and aortic stenosis	0	2	1
Aortic regurgitation and mitral stenosis...	7	2	2
Aortic and mitral regurgitation and mitral stenosis	6	7	2
Aortic, mitral, and tricuspid regurgitation	1	0	0
Aortic regurgitation and pericarditis ...	3	2	0
Aortic and mitral regurgitation and pericarditis	1	0	0
Aortic and mitral regurgitation, mitral stenosis, and pericarditis	2	0	1
	85 52.5 %	48 29.6 %	29 17.9 %

It will be seen that 52.5 per cent. come under the heading of light, 29.6 per cent. of medium, and 17.9 per cent. of heavy exercise.

TABLE XXV.—Comparing Numbers in Table XXIV with the Percentages for Light, Medium, and Heavy Exercise for the whole 10,000 Cases examined.

	Exercise.		
	Light.	Medium.	Heavy.
10,000 recruits ...	50.0 %	22.9 %	27.1 %
Ao.R. with history of rheumatic fever ...	52.5 %	29.6 %	17.9 %

It will be noticed that there is a definite tendency for the aortic regurgitant who has had rheumatic fever, and whose lesion consequently is probably of rheumatic origin, to avoid both occupations and amusements which involve muscular strain.

In the case of the 72 aortic regurgitants who gave no history of any form of rheumatism the figures are strikingly different, as shown in Table XXVI. This shows 23.6 per cent. light, 11.1 per cent. medium, and 65.3 per cent. heavy muscular exercise, as compared with 52.5 per cent. light, 29.6 per cent. medium, and 17.9 per cent. heavy for the group with rheumatic fever—a difference which seems too great to be purely accidental. The fact that 65.3 per cent. of this group were exposed to

TABLE XXVI.—Aortic Regurgitation without History of Rheumatism.

Lesions.	Exercise.		
	Light.	Medium.	Heavy.
Aortic regurgitation alone ...	4	2	11
Aortic regurgitation and stenosis ...	0	0	8
Aortic and mitral regurgitation ...	9	6	16
Aortic and mitral regurgitation and aortic stenosis	1	0	0
Aortic regurgitation and mitral stenosis...	0	0	2
Aortic and mitral regurgitation and mitral stenosis	1	0	7
Aortic and mitral regurgitation and aortic and mitral stenosis	1	0	2
Aortic regurgitation and pericarditis ...	0	0	1
Aortic and mitral regurgitation and pericarditis	1	0	0
Total ...	17 23.6 %	8 11.1 %	47 65.3 %

strain, in the absence of any other likely factor, strongly suggests that strain was the efficient cause in producing the cardiac lesion. We think it is not generally realized what an extent even comparatively short and light muscular work can raise the blood pressure and so produce increased tension of the aortic valves and other parts of the circulatory system. It is true that more than half of these cases were instances of mixed lesions, but an inflammatory and subsequent sclerotic process, starting in the aortic valve, may easily spread by continuity to the aortic flap of the mitral valve, and no doubt in many of the cases of mixed aortic regurgitation and mitral regurgitation the mitral regurgitation was due to secondary dilatation of the mitral ring, without any structural change in the valve. It may therefore be conjectured that the 47 cases of aortic regurgitation subjected to heavy muscular work, but who gave no history of rheumatism, were due to strain.

In the remaining 25 the cause is not so obvious. Three out of the 72 cases without a history of rheumatic fever had a syphilitic history, which is about the proportion we should expect if this were purely accidental, since 11 out of the total of 397 gave a similar history.

A comparison of the numbers in the light, medium, and heavy classes of Group II (those with a history of "rheumatism," growing pains, or chorea) gives percentages roughly intermediate between Groups I and III—namely, 30.1 per cent. light, 19.2 per cent. medium, and 50.7 per cent. heavy.

TABLE XXVII.—Aortic Regurgitants with History of "Rheumatism," Growing Pains, or Chorea.

Lesions.	Exercise.		
	Light.	Medium.	Heavy.
Aortic regurgitation alone ...	8	3	10
Aortic regurgitation and stenosis ...	1	2	4
Aortic and mitral regurgitation ...	7	4	17
Aortic and mitral regurgitation and aortic stenosis	0	1	0
Aortic regurgitation and mitral stenosis	1	1	0
Aortic and mitral regurgitation and mitral stenosis	5	1	4
Aortic and mitral regurgitation and aortic and mitral stenosis	0	1	0
Aortic regurgitation and pericarditis ...	0	1	1
Aortic and mitral regurgitation, mitral stenosis, and pericarditis	0	0	1
Total ...	22 30.1 %	14 19.2 %	37 50.7 %

Table XXVIII, which summarizes these results, shows clearly that the more completely a history of rheumatism is eliminated, the higher among aortic regurgitants is the percentage of cases in the group exposed to severe strain.

TABLE XXVIII.—Summary.

	Strain.		
	Light.	Medium.	Heavy.
10,000 recruits	50.0%	22.9%	27.2%
Ao. R. with history of rheumatic fever	52.5%	29.6%	17.9%
Ao. R. with history of "rheumatism," growing pains, or chorea	30.1%	19.2%	50.7%
Ao. R. without rheumatic history ...	23.6%	11.1%	65.3%

This led us to suspect that in Group II (those with a history of "rheumatism," growing pains, or chorea) a certain number of cases were due to strain and the rest to rheumatism. These 73, together with the 25 in light and medium classes of Group III, thus constitute a doubtful class, distributed as follows:

TABLE XXIX.

	Exercise.		
	Light.	Medium.	Heavy.
98 Cases	39	22	37

We were led to try how 98 cases would be distributed on the assumption that the proportion due to rheumatism and the proportion due to strain was the same as that found in the cases we considered might legitimately be classed as due to these causes. Since 162 cases have been classified as due to rheumatism and 47 as due to strain, we divided the 98 cases in the same proportion, and allotted 76 as probably of rheumatic origin and 22 as caused by strain. Dividing the rheumatic 76 into light, medium, and heavy classes, in the same proportion as those in which our 162 rheumatic cases were found to be divided, we obtained 40 light, 22.5 medium, and 13.5 heavy; adding to the heavy group the 22 we had assumed to be caused by strain, the following figures were obtained: 40 light, 22.5 medium, and 35.5 heavy.

TABLE XXX.—Comparison between the Calculated Numbers and those Actually Found.

	Exercise.		
	Light.	Medium.	Heavy.
Calculated numbers	40.0	22.5	35.5
Actual cases	39.0	22.0	37.0

The agreement is so striking that it is hard to imagine it purely accidental.

SUMMARY.

The results of this investigation lead to the conclusion that the two important causes of aortic regurgitation in the cases we have investigated—that is to say, men between the ages of 18 and 41—were rheumatic fever and strain. We have been unable to find any definite correlation in these cases between syphilis, tonsillitis, scarlet fever, diphtheria, pneumonia, gonorrhoea, or growing pains, and the evidence is against influenza. With regard to chorea, there is a suggestion in some of the results that it may be a cause, but the number of cases with which we had to deal was so small, and the proportion of them giving a history of rheumatic fever as well so large, that caution must be exercised in drawing deductions. With regard to a history of "rheumatism," there is some evidence for supposing that in a certain proportion of these cases, but not all, an affection of the same nature as true rheumatic fever was referred to.

THE second Child Welfare Congress of South America (Congreso Americano del Niño), which was to have been held at Montevideo in December of the present year, has been postponed till May, 1920, on account of problems arising out of the war and the prevalence of influenza.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

TREATMENT OF PUERPERAL SEPTICAEMIA BY "BIPP."

FOR the last two years I have used long strips of gauze or bandage saturated with bipp for packing wounds and cavities, in military surgery, in many thousands of cases. I have invariably been absolutely satisfied with the results, to the exclusion of all other treatment.

I have treated two seemingly hopeless cases of puerperal septicaemia, with the most astonishing results. Both cases were, of course, first scraped and douched in the ordinary way; they were then packed with a long strip of sterilized gauze saturated in fairly liquid bipp. For the first three times the packing was removed daily, the cavity washed out and again packed. After that the pack was changed every two days. In one of the cases the uterine cavity was down to normal size in a week and in the other case in eleven days. In one, all serious symptoms had disappeared after forty-eight hours. When I reached the other patient the whole vestibule, vagina, and uterine cavity was one mass of sloughing tissue. She was pulseless, and had rigors every few minutes. A big bit of stinking cloth was found in the uterus. All serious symptoms ceased after six days. One of the patients was a European lady, the other an Indian. The bipp used was of the strength of total solids to paraffin of 1 to 3—that is, "bi" represented one part and paraffin three parts. Some of the paraffin was vaseline and some liquid paraffin, in order to make it sufficiently thin so that the interstices of the gauze might be filled. I never used bipp stronger than this. For ordinary conditions I find 1 in 8 or 1 in 16 quite enough.

There are three things to be remembered about bipp. The least oil or fat will cause poisoning. There should be no crystals of iodoform; an amorphous powder should be used. Direct sunlight (and indirect after a while) changes its colour and makes it useless.

Before I thought of packing with bipp gauze I used a Bozeman double-flow catheter, fixed in position, to irrigate the uterus continuously with saline flowing in and out night and day. This is not nearly so effective or so easily done as bipp packing.

Nairobi, British East Africa.

R. W. BURKITT, F.R.C.S.I.

A CASE ILLUSTRATING THE DIFFICULTY OF DIAGNOSIS IN HEAD INJURIES.

THE following case is useful as showing the difficulties that may be met with in dealing with head injuries, where every important symptom is obscured by complications.

At 6.30 p.m. on February 26th, 1919, a man aged 72 was admitted to the East Suffolk Hospital with free haemorrhage from a cut $1\frac{1}{2}$ in. long over the right eyebrow. Three silkworm gut sutures efficiently controlled the bleeding, and there was no evidence of either indentation or fracture of the vault or base.

The patient was very cold and apparently unconscious. The pulse was full, 40. The left pupil was dilated and reacted to light. The right lens was opaque. There was intense rigidity of all the body; the fists were clenched and the forearms flexed across the chest. The knee-jerks were increased, Babinski's and Kernig's signs were present with great irritability, but the patient took fluids by mouth. There was retention of urine; it was drawn off and found to contain albumin. Some oedema of the legs was noticed. Lumbar puncture showed the spinal fluid to be slightly under pressure and mixed with blood. His whole condition indicated intense shock, and localization of the injury was not possible owing to the complex symptoms and the complications present; operation was therefore delayed.

Operation.

On the evening of the third day the bowels had not acted and there was suppression of urine. Surgical intervention being necessary, Mr. Hossack operated by turning down a flap over the injured area. The outer table was found to be fissured; a very fine crack started half an inch above the supraorbital foramen, and ran for about three inches along the right temporal region at an angle of 45 degrees with the horizontal.

The skull was trephined over the fissure; when the dura was incised there was an outflow of blood-stained cerebro-spinal fluid. Free bleeding was coming from the direction of the longitudinal sinus; this was followed up by the rongeur, and the sinus was found to be bleeding at the position of the anterior fontanelle; an extensive thin clot was present. The aperture was plugged with Horsley's wax. The patient died next morning.