before the examination, so that the onset of the ascites from cirrhosis of the liver, combined with hard work as a baker, would in a great measure favor a recurrence.

The second case of relapse occurred two years after operation in a patient with a severe chronic bronchitis. Two other patients answered by letter that their hernia had not recurred and that they were able to do heavy work.

As I stated above, it does not seem fair to figure percentages from the 30 cases examined because the other patients are to a great extent of a migrating class, but who would probably come to the same hospital if a relapse had occurred.

There is no question in the mind of everyone of us who has employed this modification of the Bassini operation that it is the ideal operation, especially for cases of hernia with large ring and extensive muscular defect.

The advantages of overlapping the aponeurotic and muscular structures are that the former while elastic, possess great strength and are not so likely to pull away from Poupart's ligament. The sutures placed just above and below the cord enable one to greatly decrease the size of a large internal ring so that it is not necessary to resect the veins unless they are markedly enlarged.

At the Johns Hopkins Hospital the early period cases of resection of the veins showed atrophy of the testis in 10 per cent., but in his recent article Halsted states that there have been no unfavorable results since resection of the veins is used as a more or less routine measure when the veins are large. Nevertheless the profession in general has been rather skeptical in regard both to the necessity and advisability of such a procedure. I have employed the method in two recent cases without bad results.

In a hernia associated with non-descent of the testis the resection of the veins as pointed out by Griffith and Bevan is of great aid in bringing the testis down. The fear in general of gangrene or atrophy of the testis is probably an exaggerated one, because the cord receives an arterial supply independent of the spermatic vessels.

CONCLUSIONS.

My conclusions are as follows:

1. In the normal inguinal canal the anterior wall is relatively stronger than the posterior.
2. This condition is exaggerated in inguinal hernia so that the larger the hernia the greater the muscular gap between the arching fibers of the internal oblique and Poupart's ligament.
3. In the smaller herniæ almost any of the modern operations either with or without transplantation of the cord will suffice.
4. When the muscular gap is marked some method must be employed in which a strong aponeurotic structure is used to fill the gap.
5. The Andrews modification of the Bassini operation, by utilizing a portion of the external oblique aponeurosis as an additional layer in the posterior wall of the canal, gives the latter great strength.
6. The majority of surgeons believe best results are obtained by not transplanting the cord. It is still an open question whether or not the veins should be resected.

NOTE.—The discussion on the papers of Drs. Eisendrath and McArthur will follow the paper of Dr. McArthur in a week or two.

New Variety of Ulcer.—An index medicus published in France (not Baudouin's), includes under the heading of endemic ulcers articles referring to the Murphy button.

THE RELATION OF ACUTE INFECTIONS TO ARTERIOSCLEROSIS.*

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In a recent study in which one of us has been engaged, on the cardiac and vascular complications and sequels of typhoid fever,¹ several rather suggestive facts have come to light with regard to the possible causal relation of this disease to sclerotic changes in the arteries.

One hundred and eighty-nine individuals who had passed through typhoid fever under our observation were examined months and years after their infection. It was found that among these individuals:

(a) The radial arteries were palpable in a surprisingly large proportion of cases as compared with control observations on healthy men and women who had never had typhoid fever.

Between the ages of 10 and 50, 48.3 per cent. of the old typhoids showed palpable radials, as compared with 17.5 per cent. among ordinary healthy individuals. These proportions held in every decade, and were not essentially modified in tables from which all giving a history of serious infections or alcoholic habits had been excluded.

(b) The average systolic blood pressure (Riva-Rocci) was materially higher in every decade among the old typhoids than in control observations on healthy individuals who had not had typhoid fever.

(c) The average size of the heart was larger among the old typhoids when considered in groups arranged by age, according to decade, than in figures obtained from examination of the typhoid patients at the time of admission to the hospital.

Furthermore, we have been rather impressed by the frequency with which early endarteritic plaques are found in the aorta and coronary arteries of patients dying of typhoid fever.

Out of 95 necropsies on patients dying of typhoid notes were made on the condition of the aorta in 52. In 30 of these sclerotic changes were observed. These are described as fresh in at least 21 instances.

In 62 cases the condition of the coronary arteries was noted. In 19 of these definite sclerotic changes were described, while in 4 others "yellow opacities of the intima" were observed. In 13 cases the changes were described as "early" and "fresh."

These figures would tend to support the view that typhoid fever must be regarded as a factor in the production of arteriosclerosis. The rôle of infectious diseases in the production of acute arteritis in medium-sized and smaller vessels is undoubted. Their influence, however, on the development of the more chronic changes which are included under the term arteriosclerosis has been and still is a disputed question.

*Read at the Fifty-fifth Annual Session of the American Medical Association, in the Section on Practice of Medicine, and approved for publication by the Executive Committee: Drs. J. M. Anders, Frank Jones and W. S. Thayer.

1. Thayer: On the Late Effects of Typhoid Fever on the Heart and Vessels, *Am. Jour. Med. Sci.*, 1904, vol. cxvii, p. 391. Thayer: On the Cardiac and Vascular Complications and Sequels of Typhoid Fever, the Jerome Cochran Lecture, *Mobile Medical and Surgical Journal*, 1904, vol. v, No. 1.

EDITOR'S NOTE.—One of the authors wishes it understood that the spelling used in this article is according to the standard adopted by THE JOURNAL.

It occurred to us that some light on the relative influence of acute infections as compared with other, probably more important causal factors might be obtained by a consideration of the records of palpability of the peripheral arteries in a large number of consecutive histories of patients in Professor Osler's wards. In these histories careful inquiry is made, not only into the record of previous infectious diseases, but also into the habits of the patient with regard to alcohol and heavy work.

It may be well to say at the outset that these figures deal entirely with the records of palpability of the radial arteries. It is well recognized that the palpability of a radial artery alone may bear little relation to the existence of sclerotic changes in other vessels, and, in the

CHART 1.—Showing the percentage of cases in which the radial arteries were palpable in patients giving the histories of various acute infections, alcohol and work, compared with those cases in which there was a history, no causal factors.

Pr. ct. 0.82	16.6	21.4	18.5	32.6	(No causal factor.
Cases 121	186	167	102	52	
Pr. ct. 0	12.8	33.4	47.2	48.1	(Diphtheria
Cases 10	39	92	74	49	
Pr. ct. 0	15.4	30.8	46.2	60.4	(Scarlet fever.
Cases 9	53	123	119	86	
Pr. ct. 9+	25.3	40.8	53.7	62.4	(Malarial fever.
Cases 11	74	252	253	213	
Pr. ct. 33.3	20.8	42.5	52.1	64.7	(Typhoid fever.
Cases 6	48	162	142	119	
Pr. ct. 0	25.8	41.2	44.1	65.9	(Pneumonia.
Cases 9	31	109	120	94	
Pr. ct. 12.5	13	40.6	69.3	67.8	(Rheumatism.
Cases 8	46	128	150	109	
Pr. ct. 0	24.1	60.9	61.7	70.3	(Gonorrhea.
Cases 0	29	133	128	91	
Pr. ct. 0	66.6	55.8	68.1	68.0	(Syphilis.
Cases 0	6	43	66	47	
Pr. ct. 0	43.6	59.4	64.8	70.8	(Alcohol.
Cases 1	103	589	490	357	
Pr. ct. 0	48.1	56.1	68.5	69.6	(Work.
Cases 0	83	340	312	234	

individual case, by no means justifies the assumption that arteriosclerosis exists elsewhere. It is also recognized that, in thin subjects, radial arteries which are free from change may at times be rolled under the finger. On the other hand, it is common enough to find grave changes in the aorta, coronary arteries and other vessels with perfectly soft radials. Again, in the later decades, the palpability of the radials is, in a certain proportion of cases, dependent on calcification of the media, which is entirely independent of arteriosclerosis as such. Notwithstanding these considerations, we believe that changes in the radial arteries sufficient to justify a note in the course of an ordinary visit are in a considerable proportion of cases associated with ar-

teriosclerotic changes elsewhere, and that this proportion is large enough to give a certain value to a series of observations such as we wish to present.

Out of 3,894 consecutive patients admitted to the medical wards of the Johns Hopkins Hospital, the radial arteries were described as palpable in 1,860 instances, or 47.7 per cent. No note was made as to the condition of the vessel in 1,492 cases, while it is expressly stated that the arteries were soft in 582 cases.

These cases were separated into groups in which a history was obtained of diphtheria, scarlet fever, malarial fever, typhoid fever, pneumonia, rheumatism, syphilis, gonorrhea, alcohol and heavy work. Another group consisted of those cases presenting none of these causal factors. It should be said that under alcohol are included, not alone those who used alcohol to excess, but all patients who acknowledged that they took alcohol in any form.

Chart I shows the proportion of cases showing palpable radial arteries in each one of these groups ar-

CHART 2.—Showing the percentage of cases in which the radial artery was palpable in 2,031 cases in which a history of the more serious infectious diseases was obtained, and 1,111 cases in which there was no such history, arranged according to age, by decades.

Pr. ct. 6.8	24.3	41.8	52.1	62.1	(History of infectious diseases.
Cases 44	255	664	619	449	
Pr. ct. 0.8	20.2	32.0	43.9	52.3	(History of infectious diseases.
Cases 119	252	350	241	149	

anged according to age by decades. Recognizing the fact that, above the age of 50, the proportion of cases showing calcification of the media might well be large enough to materially vitiate the results, we have considered the figures for the first five decades only.

It becomes evident from a glance at this chart that the statistics with regard to syphilis and gonorrhea must be of little value on account of the absurdly small proportion of cases in which a history of venereal disease was acknowledged. The curves fall into three main groups. Those for work, alcohol and syphilis stand materially above the others. Below this group comes a second, consisting of the remaining acute infections, and lastly, toward the base line is the curve of those cases in which the history of no causal factor was present. Rheumatism, typhoid and malarial fevers seem to lead in the second group.

In order to gain a more definite idea of the statistics with regard to infectious diseases in general, the cases were divided into two groups according to the presence

or absence of a history of the above-mentioned acute infections. In each of these groups the percentage of cases in which the radial arteries were palpable was estimated. This resulted in a demonstration (Chart 2) of the fact that the radials were palpable in considerably higher proportion in those cases giving a history of previous infectious disease.

Inasmuch as in the great majority of cases each individual presented a history of multiple causal factors, it seemed to us important to prepare a third chart in which

Chart 3.

there were included only those cases where a single one of these factors was present. When considered from this standpoint, the number of cases in each group is so small that a consideration of curves by decades becomes impossible.

Figure A in Chart 3, therefore, represents the proportion of palpable radials in the first five decades of those cases in which a history of only one of the several causal factors which we have mentioned was present.

An examination of this chart reveals the fact that

the figures simply emphasize those brought out by Chart 1. By far the highest percentage of palpable radials was found among the cases with a history of heavy labor (57.6). Next to this come the figures for the patients who gave only a history of alcohol (46.8 per cent.). Among the acute infections, rheumatism, as might be expected, leads (34.6 per cent.), with typhoid fever second (26.3 per cent.), the other infections occupying a subordinate position.

The cases giving a history of syphilis and of gonorrhea alone were so absurdly small in number that they have been omitted from the list. Only 12 cases under 50 years of age gave a history of syphilis alone; among these were 2, 16.6 per cent., who showed palpable radials; 10 cases gave a history of gonorrhea alone; in 40 per cent. of these the radial was palpable.

Chart 4 illustrates the proportion of palpable radial arteries in those cases in which there was a history of

CHART 4.—Illustrating the percentage of cases showing palpable radial arteries in patients giving a history of heavy work, alcohol or infectious diseases alone, as compared with those cases in which the history of a causal factor was obtainable.

acute infections only, along with those presenting a history of alcohol and work alone. The lower line represents the cases in which there was a history of no causal factor.

The relation of the percentages of palpable radials in these several groups is brought out more clearly in Figure B of Chart 3. The small proportion of palpable radials among the cases giving a history of acute infections alone (24.3 per cent.), as compared with those giving a history of heavy work (57.6 per cent.) or alcohol (46.8 per cent.), stands out strikingly.

CONCLUSIONS.

As the result of an analysis of the records of nearly 4,000 patients entering consecutively the medical wards of the hospital, we find that:

1. The percentage of palpable radial arteries is materially higher among those individuals in whom there is a history of heavy physical labor and of the use of alcoholic stimulants than in the remaining cases. This

percentage is appreciably higher in the cases giving a history of heavy work.

2. The percentage of palpable radial arteries is higher among those cases presenting a history of severe infectious diseases than among those in which this history is absent or among those in which a history of no causal factor could be obtained. The proportion is, however, far below that in the case of work or alcohol.

3. Rheumatism appears to be the acute infection after which the percentage of palpable vessels is highest, and next to rheumatism, typhoid fever.

As previously stated, it is well recognized that the results of such an investigation as this justify only rather rough generalizations.

Are we even warranted on a *post hoc propter hoc* principle, in assuming that work, alcohol and, in a subordinate way, the infectious diseases are the main or important causes of the changes which result in palpable radial arteries? Not necessarily. It is, however, not uninteresting that the results should, so far as they go, support the generally accepted views.

It seems to us there can be small doubt that the main etiologic factor in the development of the hyperplastic thickening of the intima, which constitutes so important an element of arteriosclerosis, is overstrain of the vascular walls, continued or intermittent high tension, whatever its ultimate cause may be. Heavy physical labor is assuredly one of the most important of these causes. It is not inconceivable that the rôle of the acute infections may be rather in the production of those focal degenerations with secondary regenerative changes which constitute the other important element in arteriosclerosis.

ARTERIOSCLEROSIS OF SYPHILITIC ORIGIN.*

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Undoubtedly syphilis is quite capable of producing, and does produce, in certain instances, arteriosclerosis, but the existing relationship is somewhat obscure.

There is no disease in the whole category of diseases which brings to view so many and varied symptoms as syphilis, and it would be singular, indeed, if it did not enter as a causative factor in the production of arteriosclerosis when taking into consideration its known tendency to produce sclerosis in various organs.

That syphilitic arteritis and endarteritis do occur not infrequently, and that, too, early during the history of this disease, is recognized as a fact both by clinician and pathologist; furthermore, there is probably no disease which is so amenable to treatment, if such be instituted prior to pathologic changes which are not absolutely beyond repair. It will perhaps ever remain an open question as to just how syphilis attacks the vessels, but enough is known to lead us to presume that it comes about through the lymph spaces supplying the vessels.

I have often wondered if one day we would not come to recognize that vascular changes invariably occurred prior to organic changes in many of our so-called nervous diseases. Nerve-cells must be fed, and any alterations of the vessels themselves necessarily would secondarily bring about a starvation process, provided such alteration became permanent.

That arteriosclerosis is responsible for locomotor ataxia in certain instances and that syphilis enters largely as a factor in bringing about these results is a view regarding which I have rather firm convictions. I have long been persuaded that arteriosclerosis does not depend on any specific irritant for its production, but that in all cases a combination of elements enter as causative factors. Any agent or combination of agents that is continuously left to circulate within the vessels which are foreign to normal cell life will sooner or later be followed by the very changes now under consideration, no matter whether said agent or agents be alcohol, lead, syphilis, auto-intoxication, or otherwise. To me it is passing strange that a drug like mercury, which is more commonly used in the treatment of syphilis than any other, and has been for ages past, has not been considered one of the chief agents in the production of arteriosclerosis. When we come to consider the fact, it would be almost marvelous if at times we did not recognize the possibility, and even the very strong probability, of such being true, when we know so well the method commonly adopted by the profession at large to-day in the administration of mercury for the relief of syphilis.

What has been the custom and teaching of some of our very best writers regarding this subject for the past quarter of a century? Have we not been led to believe that the so-called tonic treatment of syphilis with mercury was the only royal road to success? Has it not been the practice of many physicians to prescribe mercury for a period of two years, practically without interruption?

I maintain that mercury is a metallic poison and altogether foreign to normal cell production, and when it is thrown into vessels, and there left to circulate for many months, and even years, whether done on the advice of a physician or through self-prescribing, we will find an agent that is just as capable of producing arteriosclerosis as syphilis or any other agent.

So many times has it happened that patients have come to my office who have been under continuous syphilitic treatment for many years, and, after having given a complete history of the affair, draw from their pockets a little bottle of mercury pills, or of some other pharmaceutical preparation, and relate with painstaking care just how much of this very much abused drug they have been taking during the past three or five years—daily, as the case may be—practically without interruption. It is common enough, I assure you, to warrant me in the belief that to-day more persons are treating themselves for syphilis than are under treatment by regular physicians. With this reckless, senseless and indiscriminate use of a drug like mercury, need we expect otherwise than to find arteriosclerosis resulting, particularly so when combined with one of man's oldest and most treacherous enemies, syphilis?

A Law in Puerperal Pathology?—The *Semana Medica* No. 10, 1903, quotes Corminas to the effect that in his large experience he has never known a fatal case of puerperal infection associated with acute mammitis. Recovery is the invariable rule when the puerperal infection is accompanied by an acute mammary lesion. He suggests that the presence of a lesion with attenuated infection may induce the formation of antibodies which exert a favorable influence on the virulent focus in the uterus. It is possible, he adds, that if fixation turpentine abscesses were made in the breasts instead of elsewhere, they might have a more powerful immunizing action, especially in case of infection involving the genital apparatus.

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