

AN INVESTIGATION INTO THE METHOD OF
TREATMENT FOR CHRONIC DISEASES OF THE HEART
BY PHYSICAL EXERCISES.

Being a Thesis for the Degree of M.D., Edin Univ.

B Y

I A N H O W D E N, M.B.,C.M., Edinburgh.

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During the last two years a considerable amount of attention has been devoted, both by the Profession generally and also from the outside public, to a new method of treatment for those suffering from chronic heart disease, and which is at the present time known as the Schott or Manheim Treatment.

From the very commencement of the time when this treatment became known in this country its upholders have urged for it certain very definite and very quickly obtained results. These results, however, have been received with a considerable degree of scepticism by the majority of the Profession, and it is the purpose of this paper to set forth, as clearly as may be, the conclusions obtained from an

experimental enquiry, carried out on lines strictly analagous to those laid down by Schott, so that it may be seen to what extent his results may be obtained by anyone working in the most favourable circumstances in this country.

It will therefore be most convenient for the following order to be followed in this paper.

1. A brief description of the Treatment as carried out at Nanheim.
2. A description of the system carried out in the experimental inquiry to which reference has been made.
3. An examination and analysis of the phenomena which, it is asserted, follow upon the administration of the treatment.
4. An enumeration of some typical cases selected from the patient who underwent the treatment.
5. An examination and analysis of the results here obtained, and a comparison of them with those obtained at Nanheim.

The method of Treatment for chronic diseases of the heart which is now so widely known as the "Schott Treatment" was elaborated at Bad Nanheim by the brothers Theodor and August Schott, and was first brought into notice in this country by Bezley Thorne who in 1891 published a transcript of a paper by

Theodor Schott in the "Lancet". It was not until three years later, however, that attention was generally drawn to it, but since 1894, when the same observer again drew attention to the system, a steadily increasing degree of interest has been manifested in it, and while around some of its claims there has been waged the fiercest of academic wars. Besides the brothers Schott, Bezley Thorne, Saundby, Sir Philip Smyly, Sir William Broadbent, Sir Thomas Grainger Stewart, Lauder Brunton and others have contributed writings on the subject and while there is not perhaps very much dispute as to the general efficacy of the Treatment, yet there is but little agreement at present as to the interpretation of some of the phenomena which follow its administration.

At Nanheim the treatment is carried on in two distinct branches. The patient is first subjected to a course of baths and this is further supplemented by the administration of a series of modified gymnastic movements - "Movements against Resistance" or "Widerstand gymnastik" as they have been called.

It is with the latter - the movements against resistance - that I am concerned in this

paper, as it was solely with regard to them that the investigation in which I took part was directed, and it is worthy of remark that in many ways they are the more important of the two methods. To carry out a long course of Thermal Baths with water medicated so as to resemble as closely as possible that of the natural springs at Nanheim is in this country at best a tedious and unsatisfactory performance. But with regard to the Movements these objections cannot be urged. The exact exercises as practised at Nanheim can be easily learnt and applied by any intelligent attendant; no special apparatus or accommodation is required, and instead of a mere imitation of or approximation to the actual process being all that we can offer as is the case with the baths, we can carry out with great exactitude the identical movements elaborated and classified by the Schotts themselves. This method, therefore, is the one which is more likely to be of use in this country, for patients whose occupation or whose means will not allow them to leave it for a lengthy period, and for this reason the enquiry was first of all directed towards it.

The key to the series of exercises as administered at Nanheim may be expressed in Theodor Schott's own words "Movements without design weaken the heart, movements with design on the contrary strengthen it", and in exemplification of this he has drawn up a series of eighteen exercises which are performed successively on the hands and arms, feet and legs, trunk and neck. In each case the patient is required to move his body or his limbs in a certain way, while the operator with his hands offers resistance to the movement, and the degree of this resistance is carefully graduated according to the patient's strength. It is unnecessary for me to copy at length the directions which he gives for their mere mechanical administration. It is by himself admitted that while on the one hand these exact movements possess no especial virtue in themselves as such, yet on the other hand, the mere mechanical exercise of them upon the patient without the recognition of certain guiding principles and the exercise of much tact and observance on the part of the administrator will not only do no good, but may even be productive of much harm. It will indeed be well to

quote his own instructions to the administrator, and it is to be noticed that these instructions are given not to one merely trained as a masseur, but for the guidance of men whose powers of observation and perception has been trained by a full medical curriculum.

1. Each movement is to be performed slowly and evenly, that is at a uniform rate.
2. No movement is to be repeated twice in succession in the same limb or group of muscles.
3. Each single or combined movement is to be followed by an interval of rest.
4. The movements are not to be allowed to accelerate the patient's breathing and the operator must watch the patient's face for the slightest indication of
 - (a) dilatation of the alae nasi.
 - (b) drawing of the corners of the mouth.
 - (c) duskiness or pallor of the cheeks or lips.
 - (d) yawning.
 - (e) sweating.
 - (f) palpitation.
5. The appearance of either of the above signs of distress should be the signal for immediately interrupting the movements in process of execution and for either supporting the limb which is being moved or allowing it to subside into a state of rest.

6. The patient must be directed to breathe regularly and uninterruptedly and should he find any difficulty in doing so, or for any reason show a tendency to hold his breath, he must be instructed to continue counting, in a whisper, during the progress of each movement.
7. No limb or portion of the body of the patient is to be constricted so as to compress the vessels and check the flow of blood.

The rationale of these directions is plain to see; the regulator after all is the patient himself, and any mere mechanical substitute for his own indications will lead to error, and those symptoms which are enumerated in the directions given above, show sufficiently the precautions that are to be taken.

Bezley Thorn in his monograph on the subject (1896) has the following, and as an ardent disciple of the inventor of the method we may surely take his words as authoritative "No greater mistake could be made than to assume that the mastery of mechanical details is a sufficient equipment for either the physician or the operator, for in no two cases is their expert and judicious application likely to be precisely similar. In the first place, it should be understood that there is no magic in the exact sequence

which has been adopted in the foregoing description (of the exercises) many patients are at the beginning, unable to perform the full series without experiencing what is always to be avoided, namely, fatigue or distress as exhibited by one or more of the symptoms which have been enumerated; others cannot with advantage submit at once to movements of some special parts, such as the trunk or lower extremities. Some who are confined to bed, cannot in the nature of things execute a portion of the exercises

The time to be occupied by the several movements, the interval of rest and the measure of resistance to be offered are all points upon which the judgment of the physician should be expressed. Should, for example, the pulmonary circuit be obstructed, as it is in the case of emphysema and asthma and with rigidity or stenosis of the aortic orifice, syncope may be easily induced. In presence of such conditions the

resistance should be limited to feather weight, the movements slowly executed and the intervals prolonged to allow the heart and vessels time for the adjustment of their mutual relations, to the changes which are being rapidly effected in the flow and distribution of the blood.

The complete series of exercises in the Nanheim system is divided into 18 movements. The first five are movements of the arms in all the various directions, flexion and extension, abduction and adduction, against resistance, and are followed later on by six others in which the arms are concerned, but which are slightly more difficult of performance. Three relate to movements of the trunk, and the rest - four - are devoted to the movements of the legs. It will thus be seen that the thoracic muscles obtain a large share of attention, and are perhaps the most fully exercised of all.

I have drawn attention particularly to the fact that the success of the treatment lies more in the obserxation of the principles underlying the application of the exercises, than in the mere exercises themselves, and I have done so, for the reason that the exercises which were administered upon a considerable number of patients under my own care and observation were quite different in detail, while the

general principles were identical with those enumerated above. They were in themselves more of the nature of what are known as "Swedish Gymnastics" and were administered by a trained Swedish Masseur - and they may be thus described:-

- I. Both arms were grasped by the operator and rotation at the shoulder-joint slowly, but completely effected, the patient being seated.
- II. The feet grasped in succession and rotated at ankle-joint - the patient still being seated.
- III. The patient standing up, kneading massage down the whole length of the spine, and friction massage generally over the back.
- IV. The patient supine; each leg in succession grasped above and below knee and rotated at the hip-joint with alternate flexion and extension both at hip and knee.
- V. General massage to abdomen.
- VI. Patient seated, head rotated flexed and extended to the full extent.
- VII. General massage to the arms in succession.
- VIII. General massage to the legs in succession.

IX. "Heart Massage" consisting in rapidly tremulous movements of the operator's hands while lightly in contact with the patient's thorax; and also a very light percussion both by the ulna edge and flat palm of the hand, this latter is affected by a peculiar movement of the operator's wrist and requires for its execution considerable skill and dexterity.

The time spent upon each exercise varied from one minute to five, the whole series lasting generally for half an hour.

The above described exercises were grouped together under the title of Passive - and were applied at about the same time each day of the week, with but few interruptions. After the patient had been submitted to a course of these movements for a period of time, varying from ten days to three weeks the "Active Exercises" were substituted for the first six of the "Passive Movements". These active exercises may be thus described.-

1. The patient being seated flexes and extends his arms against the steady resistance of the operator.

2. The patient being seated flexes and extends his legs against the steady resistance of the operator.
3. The arms being extended horizontally in front, the patient abducts and adducts against resistance.
4. The legs are abducted and adducted in an exactly similar manner.
5. Trunk flexed and extended in all possible directions against resistance.
6. Head rotated, flexed and extended similarly against resistance.

These six active exercises were followed by the massage indicated under sections 7, 8 & 9 of the Passive Movements; the time occupied in the performance of the Active Exercises with the subsequent massage was generally about 20 minutes. In both the Passive Movements and the Active Exercises the degree of energy that was exerted by the operator, and the length of time occupied at each application

varied according to the general condition and capability of the patient, and as a guage, the respiration was carefully watched the whole time. The patient was directed to breathe as naturally as possible, and the exercises were immediately ceased or modified if the respiratory movements became in any way accelerated or embarrassed.

It will be seen from the above description that although the movements differed considerably in detail from those carried on at Nanheim, yet the broad principle underlying both is the same. It is essentially exercise without exertion, graduated by an independent observer according to the strength and capability of the patient undergoing the treatment.

What may be the precise physiological method of action of the exercises is indeed the subject of some discussion, and to it reference will later be made. But what has principally to be dealt with here, is not a physiological but a clinical question. It will further be noticed that the exercises which I have described are of such a nature that they can

be easily and effectively applied by any intelligent attendant, with the possible exception of the last one - termed "Heart Massage" which is indeed somewhat difficult of acquirement.

The treatment therefore, is one that can be readily carried out either in hospital or private practice.

In what has been already written I think that it has been demonstrated that between the Schott movements and those I have described there exists a great similarity - or rather an identity - of principle, it is therefore, a reasonable assumption that the results which were obtained at Nanheim should have also been seen to follow the application of the Swedish Movements. If this were the case then indeed it would be proof of some weight towards the establishment of the theory that such movements can exercise a beneficial effect on a diseased heart; while on the other hand if no such results were seen to follow, the question would now be to discover to what the various cures were due if not to the movements. Let it be said at once that to a very great

extent the results obtained in this investigation were ~~in some respects~~ similar to those claimed for the Nanheim treatment by Schott, and that the differences when they existed, were rather of a nature in themselves to confirm the validity of the results, and were easily to be explained by the modified conditions under which the treatment was carried on.

In comparing then the results of the two varieties of the Treatment, it is necessary to analyse the broad claims that are put forward by Dr Schott - and so warmly defended by Dr Bezley Thorne, so that each component may be rigidly examined by itself and compared with the corresponding factor in the experimental Treatment.

On examination the claims set forth for the Nanheim treatment are found to be very wide, and far reaching, and they may be best shown in the subjoined table.

A. General Effects.

1. Subjective. Impressions and opinions of the patients.

It is claimed that from the first, the

patients enjoy the treatment and are at once conscious of an improved state of health from it.

2. Objective. Alteration in appearance of the patients and in their capability of exercise and for the enjoyment of life generally.

Patients we are told, are so altered in appearance in a few weeks that their friends have difficulty in recognising them.

The bedridden dyspnoeic patient whose life was a burden to him, leaves his bed, takes walks and generally is able once more to derive some comfort and satisfaction from life.

B. Particular Effects.

3. The Pulse.

The frequency of the pulse is said to be commonly reduced at the very first application of the exercises from 10 - 15 per cent, and this diminution in its rate is claimed to be maintained and increased throughout the

period of the Treatment and to be permanent afterwards.

The rhythm of the pulse is improved, becoming much more regular.

The tension during the beat is said to be lowered, and that between the beats to be raised.

4. The Sounds of the Heart.

With regard to these it is claimed that they are rendered more clear and distinct. *Impurities* and functional murmurs are said to disappear. Murmurs arising from stenosed valves are said to diminish in intensity in some instances, while a vanished pre-systolic mitral may reappear.

Murmurs arising from incompetent valves are in some cases abolished, and in others lessened in intensity.

5. The Size of the Heart.

The upholders of the treatment claim that an immediate and more or less permanent reduction in size of a dilated heart takes

place under its application. This is denied strenuously by the opponents to the Treatment, and this point seems to have been selected as the crucial one by which the success or failure of the treatment is to be decided.

On the one hand it is urged that the area of cardiac dullness is diminished by the Treatment and that this diminution expresses, and is due to, a corresponding shrinkage in the bulk of the heart.

On the other hand the very amount of the diminution of the area of dullness is challenged by the other side, and it is further maintained that this diminution when it does take place is by no means due to, or representative of a diminution in the heart's bulk, but arises from causes altogether different.

This point, therefore, was one to which very special attention was paid in the experimental investigation; but it may be allowed here, to point out that however much professional men may dispute over the interpretation

of a physical sign, the patient remains blissfully ignorant of its import and depends for his own impressions upon his subjective symptoms.

6. Other symptoms directly consequent on the cardiac condition, such as dropsy, pulmonary congestion and so forth.

It is claimed that a great improvement is manifested with regard to these.

7. Other symptoms which may or may not be less directly due to the heart, such as indigestion, constipation and general malnutrition.

These have been claimed separately, as although they may in many cases be the sequences of the cardiac deficiency, yet in many cases they must have preceded it, and may also have to some extent been factors in its causation.

It is claimed with regard to these that an improvement almost invariably takes place..

Such being the nature of the Treatment as carried out by Schott at Nanheim, and the beneficial effects of it being of the nature and extent which has been indicated, it is now necessary to consider the actual results which were obtained in the Investigation to which reference has ~~been~~ more than once been made.

The total number of patients subjected to the movements under my supervision has been up to the present moment eleven, but of these there are several that cannot be taken altogether as typical. In some cases it has only been possible to apply the Treatment in an irregular and unsatisfactory manner. In one case at least death ensued at a very early date from an intercurrent disease, while in another case a fatal result also took place, though previously a considerable improvement in the cardiac condition had been manifested. Death on this occasion was due to Pneumoniâ. There remain, however, the following cases which may be taken as in every way typical of the treatment, the class of patient, and general result, as far as the heart is concerned.

Case I. P. M., by occupation a hairdresser, was admitted to the Wards of the Royal Infirmary at Edinburgh on the 7th. October 1895.

On admission he complained of great breathlessness, pain over the chest and constant giddiness.

This man's condition was very bad. He was ill nourished in body, and scarcely able to walk at all. His expression was silly and rather vague, but with all, miserable and unhappy. His eyes were prominent and surrounded by deep black pouches. His speech was hesitating and slow - and there was a curious hesitancy in his method of answering a question. He took some time, apparently, to realise the the meaning of the question and then a further period was requisite before he could formulate his answer. His general personal habits were untidy and slovenly. His bowels were constipated and irregular. His digestion very poor indeed, and there were further peripher~~al~~ neuritis about him - the extensors of his legs being partially paralysed; the knee-jerks absent; and the gait being distinctly suggestive of alcoholic neuritis.

On Examination his heart was found to be

considerably dilated, the transverse diameter being $7\frac{3}{4}$ inches, and the apex beat lying 7 interspace $1\frac{1}{2}$ inches external to the mammary line. There was present a mitral systolic murmur at the apex, and an aortic systolic and diastolic at the base. The bases of both lungs were also slightly congested, and his legs and feet were oedematous.

From these particulars some idea of this man's miserable condition can be obtained.

For the first fortnight he was placed upon digitalis, 10 minims of the Tincture being given thrice daily. This in conjunction with the rest and regular habits, and food of the Hospital had, however, fifteen days after his admission effected no perceptible change in his condition. The digitalis did not seem to agree with him, as his indigestion remained unimproved and he was at times subjected to severe attacks of diarrhoea. On the sixteenth day after his admission the modified or passive movements were commenced, and were carried on regularly for a fortnight. At this date after 13 applications I find the following note concerning him. "He is

now greatly improved in health and much brighter and quicker intellectually - fit, in fact, to resume his occupation. He is quite strong and steady on his legs, though his gait is still rather shuffling. He is able to do his share in the ordinary duties of a convalescent in the ward".

Such is the record of the more general changes that took place, while with regard to the others the following notes speak for themselves.

Pulse, before 1st. Application. 88 small & irregular.

after " " 80 better & more regular

before 2nd. " 84 rather irregular.

after " " 75 better and more regular.

Average diminution throughout the period during which the exercises were applied was about 12 per cent - the pulse finally remaining constant at about 78, being much improved in character and rhythm.

The Sounds of the Heart became more regular and more clear. The mitral systolic was still present when he was dismissed but was much less marked ed



P. M. case 1. Tracing 1.

Tracings of Cardiac Dullness.

Black ink before the exercises

Red — after —————



Case 1. Tracing 2.

2nd Day's Treatment

Black Ink before the Exercises

Red — after —————



Case 1 Tracing 3. Third Days Treatment.

Black Ink before Treatment
Red - after -



Case 1

Tracing 4

After a weeks treatment

Black ink before Treatment

Red — after —



Case 1 Tracing 5 After a fortnight's
treatment.

Black ink before Treatment
Red — after ———



Case 1. Tracing 6. Just previous to
dismissal -
No change effected by exercises.

The same may be said of the aortic murmurs.

The size of the heart showed considerable alteration - as represented by the area of cardiac dullness. The transverse area of this at the commencement measured $7\frac{3}{4}$ inches and at the termination it measured $6\frac{1}{4}$ inches.

The effect of various applications of the exercises is shown in the adjoined tracings.

The oedema in the legs and feet entirely disappeared, while the lungs showed no trace of congestion on his dismissal - on Dec. 9th. 1895.

His indigestion and constipation were greatly relieved; the improvement in these particular directions was most marked.

Case II. T. W., aged 53 by occupation a carpenter in the Royal Navy, came under treatment on Nov. 4th. 1895, complaining of pain in the side and breathlessness. He had recently recovered from left sided pneumonia, the lung on that side still showing some dullness. In other respects he was a healthy well nourished man.

On examination his heart was found to be dilated, the transverse diameter of the dull area being

There were also present systolic and pre-systolic mitral murmurs.

Treatment in this case was carried on for three weeks, and he left on Dec. 2nd. in a very greatly improved condition. The pain and breathlessness had gone; the murmurs were still present and practically unaltered. The changes in the area of dullness are shown in the accompanying tracings.

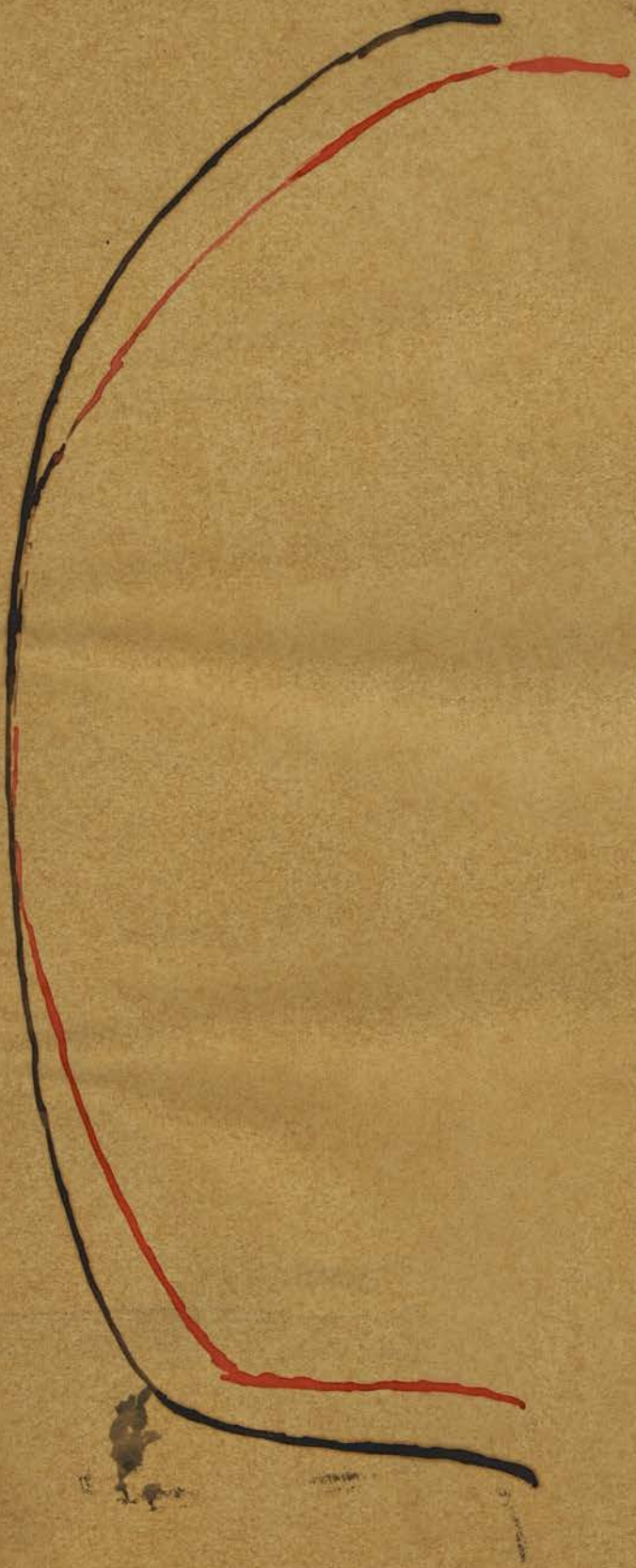
As regards other treatment, Tinct. Digitalis minims X, thrice daily during the first week. This was then stopped and Citrate of Iron and Quinine, gr.V, thrice daily, continued for the rest of the period while he was under treatment.



Case 2 Tracing 1. First Days Treatment,
Before & After.



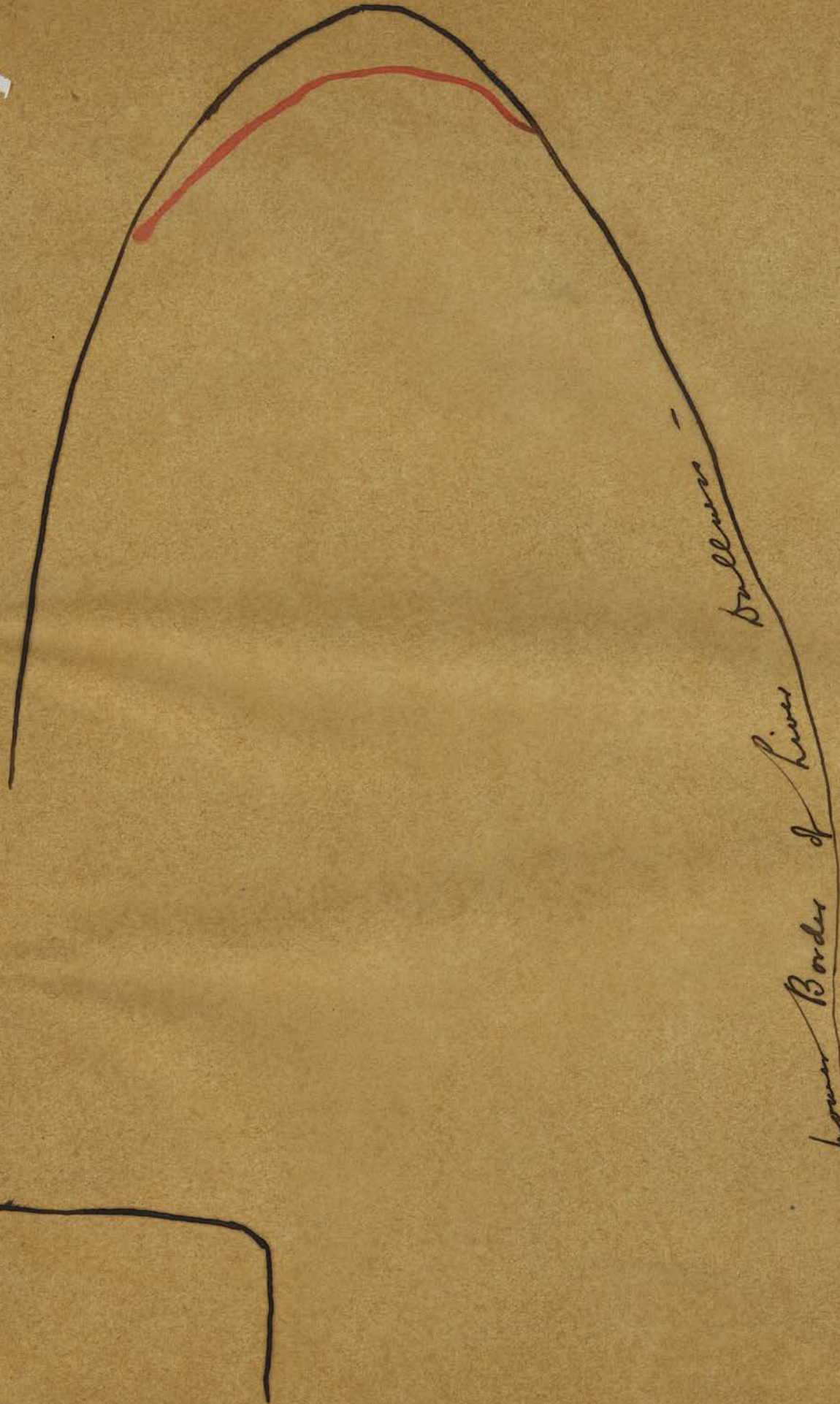
Case 2 Tracing 2 Before At 65 2nd Day's Treatment



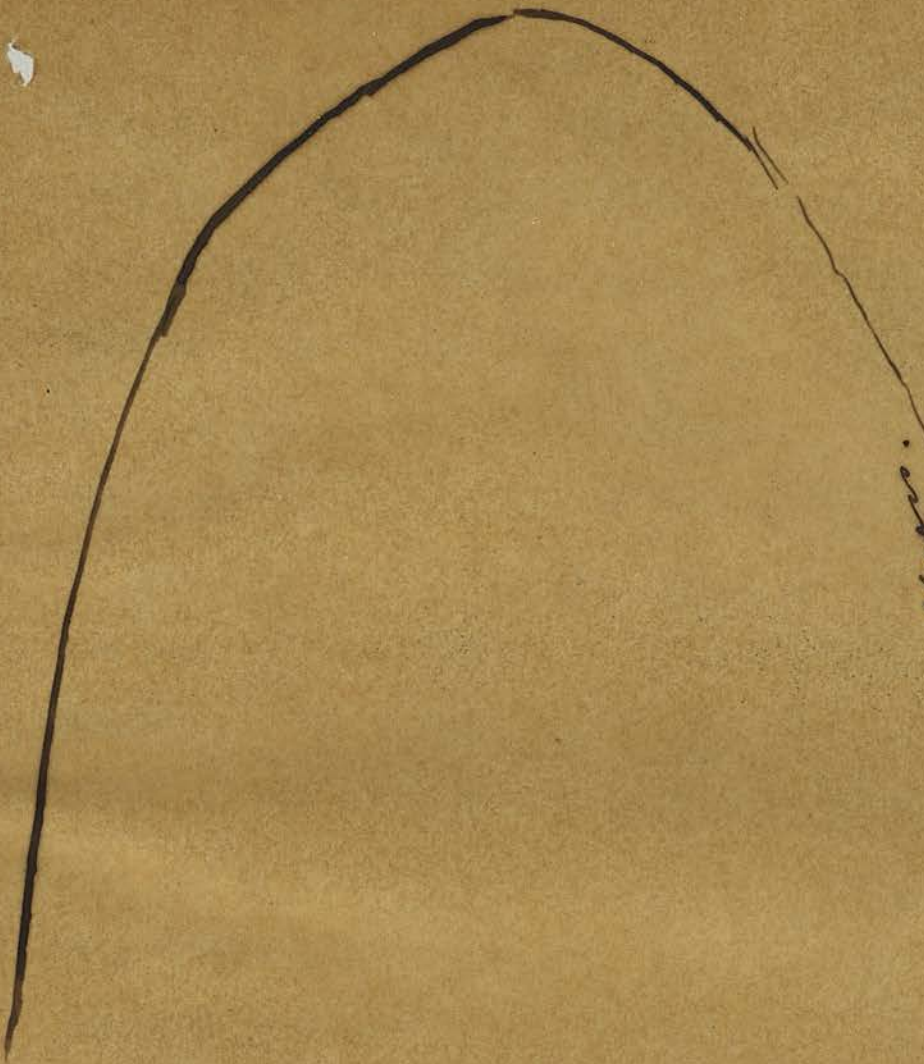
Before & After 3rd Days Treatment

Tracing 3.

Case 2



Lower Border of Liver
Case 2 Tracing 4 B. for + Afflu
8th Application



holliness.

hollow Bards & hives

Case 2

Tracing 5.

Final Result.

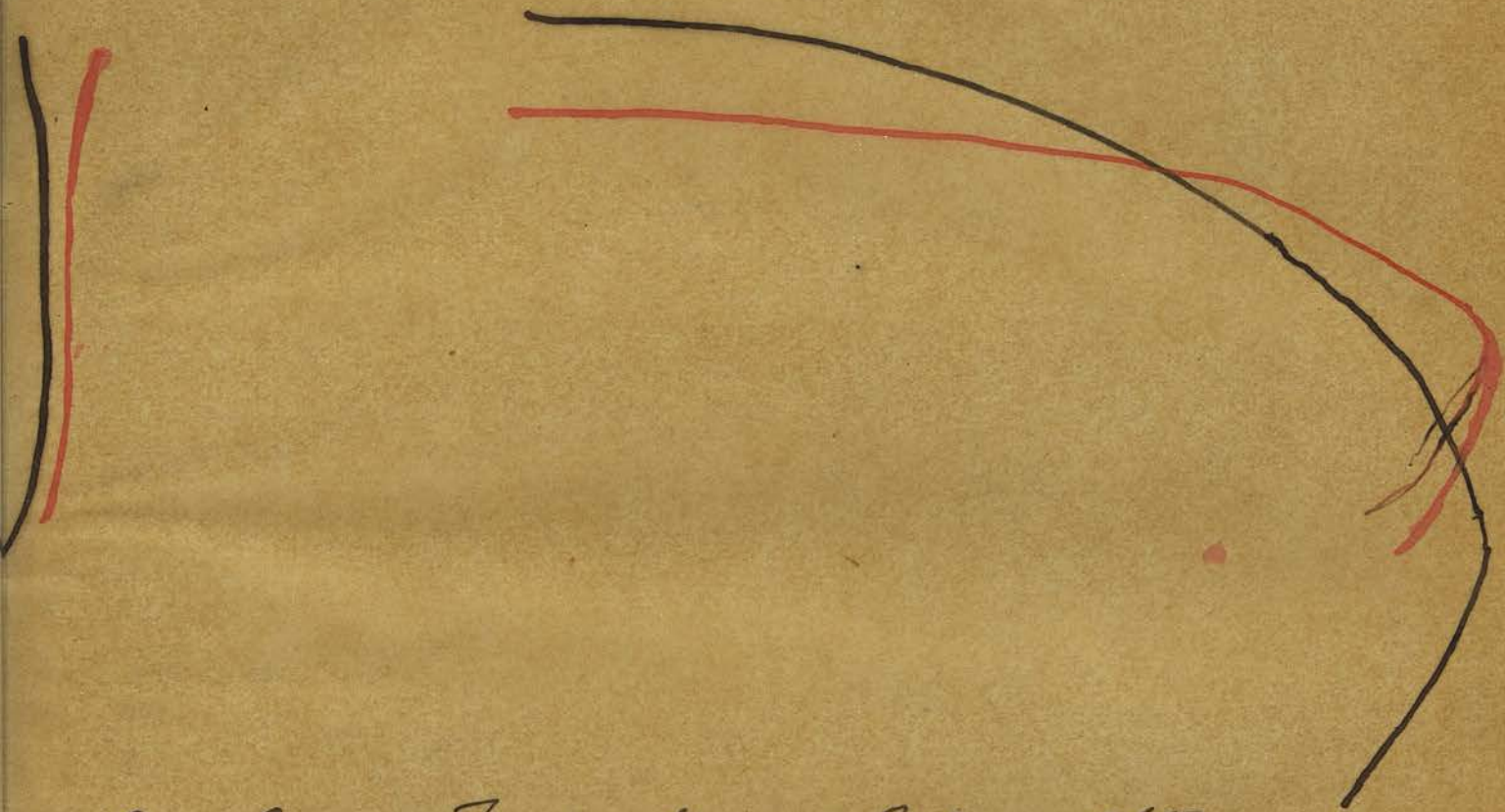
to change problems by exercises

Case III. C. M., aged 61, Distiller, came under treatment on Oct. 14th., complaining of weakness and shortness of breath. On examination he was found to be in a very weak state. His heart was considerably dilated, and gave evidence of mitral insufficiency and of aortic stenosis and insufficiency. The bases of both lungs were congested; there was oedema of the legs and feet, and a considerable degree of albuminuria was present.

The treatment was begun with the greatest care and in a very mild degree on Oct. 25th., but only 7 Applications were made, when Pneumonia set in and he died on Nov. 4th.

With regard to the tracings in this case it will be noticed that the upper border was markedly lowered, while the apex was projected further into the left axillary region. From a consideration of these it seemed as though the heart had rotated round an antero-posterior axis, lowering the base and raising the apex.

Case 2. History in first case



Case 3.

Tracing 1.

Before & After

1st - Day



Case 3

Tracing 2

Before & After

2nd Day's Treatment



Case 3

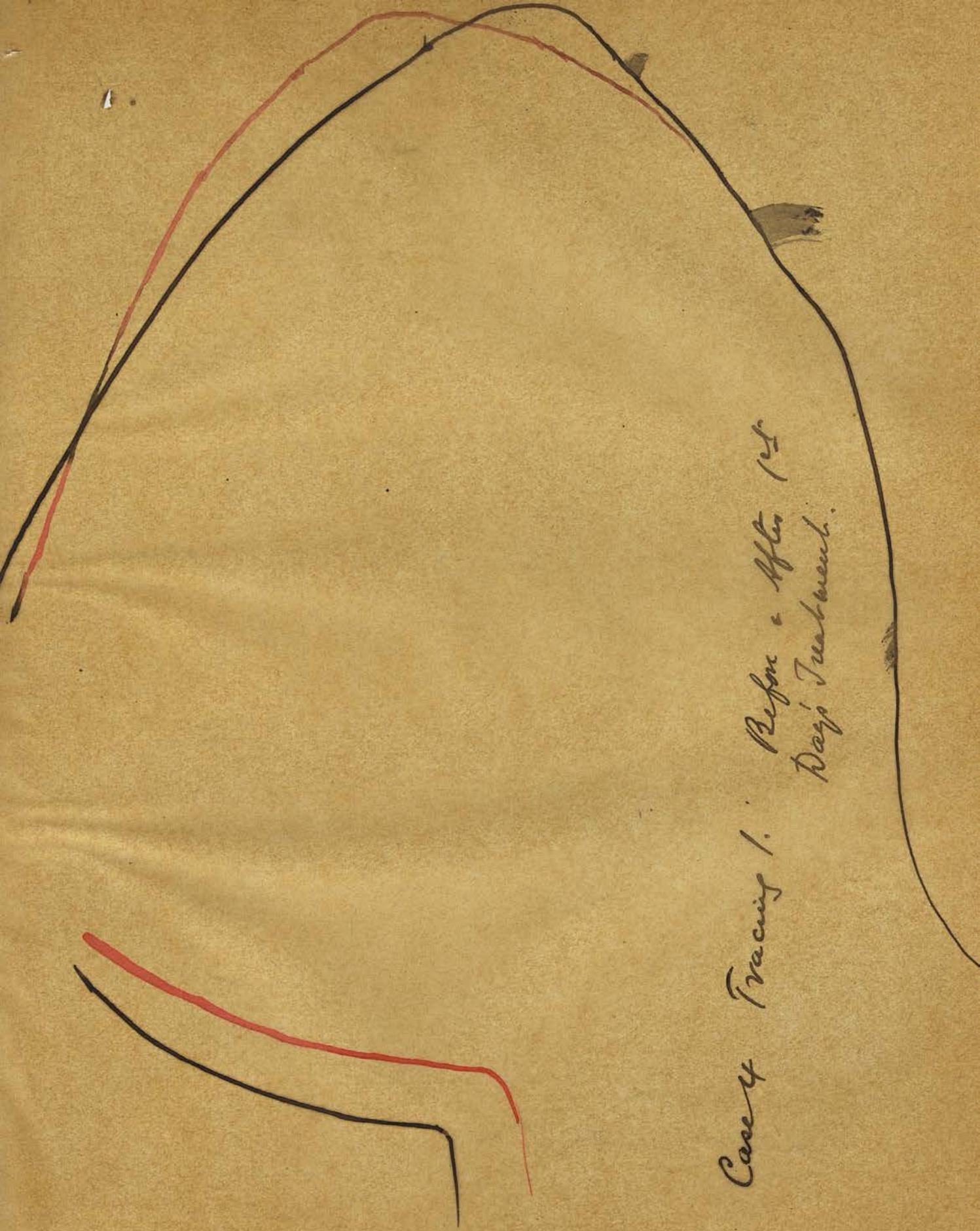
Tracing 3

Before & After 4th
Days Treatment.

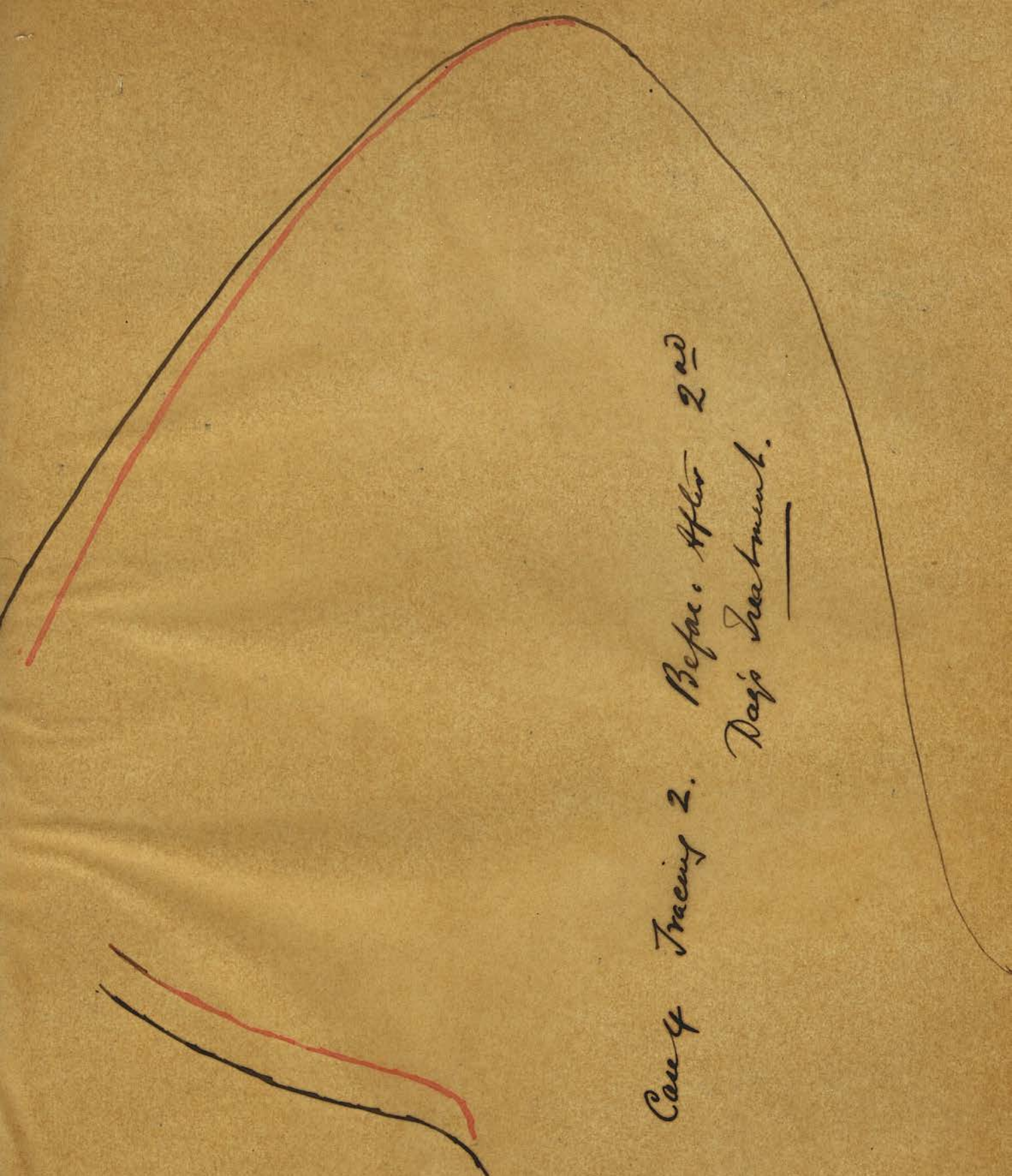
Case IV. T. H., aged 62, by occupation a labourer was admitted on Oct. 23rd., complaining of shortness of breath. On examination he was found to be a strong healthy man in most respects, his heart, however, being dilated, and his mitral valve incompetent. There was also some degree of atheroma in his arteries.

The exercises were commenced upon him within a few days of his admission to the Hospital, and were continued for a fortnight, at the end of which time he was discharged practically cured as far as was possible. His heart was reduced considerably in size, the murmur was much less marked, and his general health in every respect better.

No medicines were administered during his stay in the Hospital once the Treatment had begun.

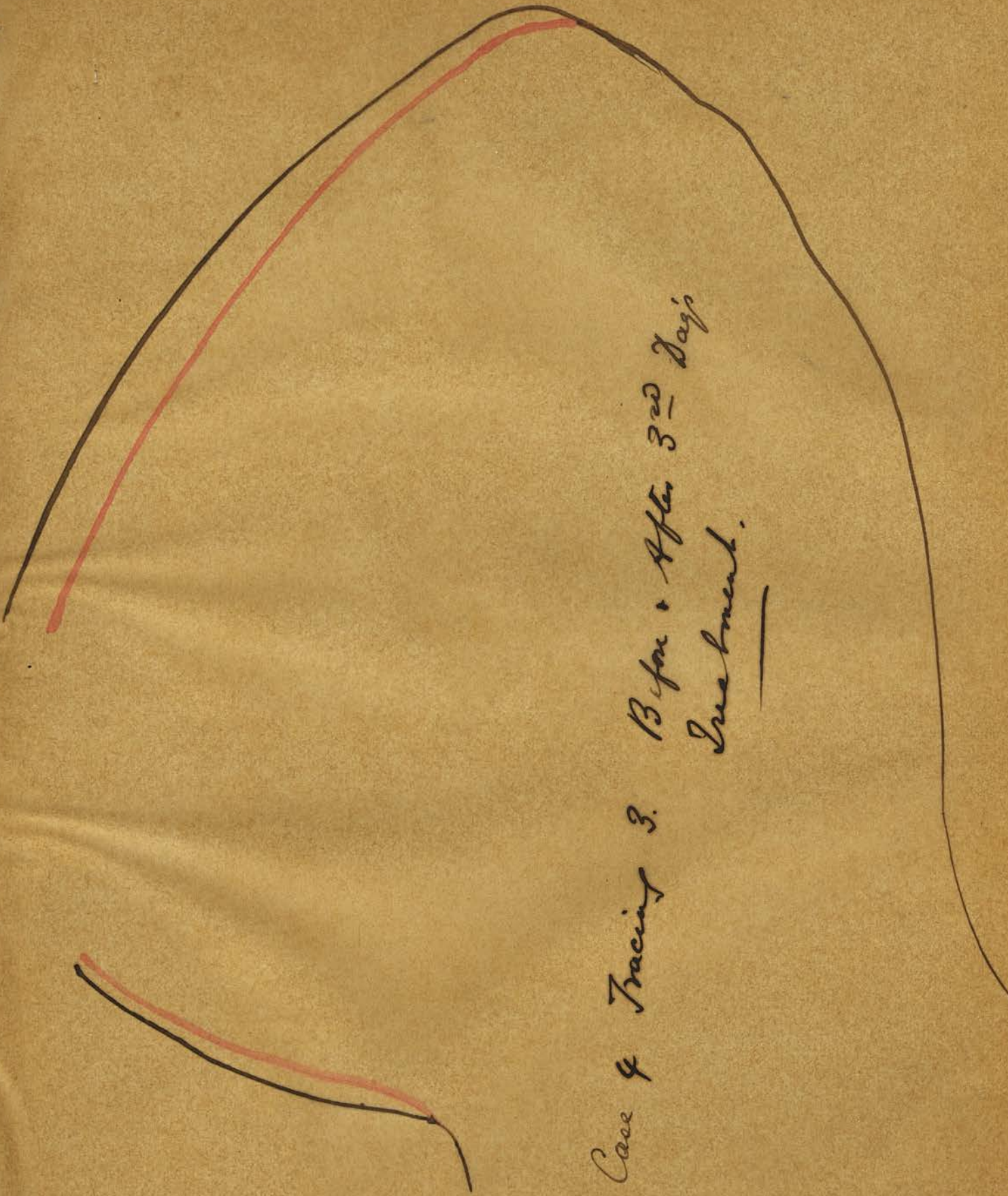


Case 4 Tracing 1. Before & After 1st
Days Treatment.



Case 4 Tracing 2. Before. After 2nd
Days Treatment.

Case 4 Tracing 3. Before & After 3rd Day's
Treatment.

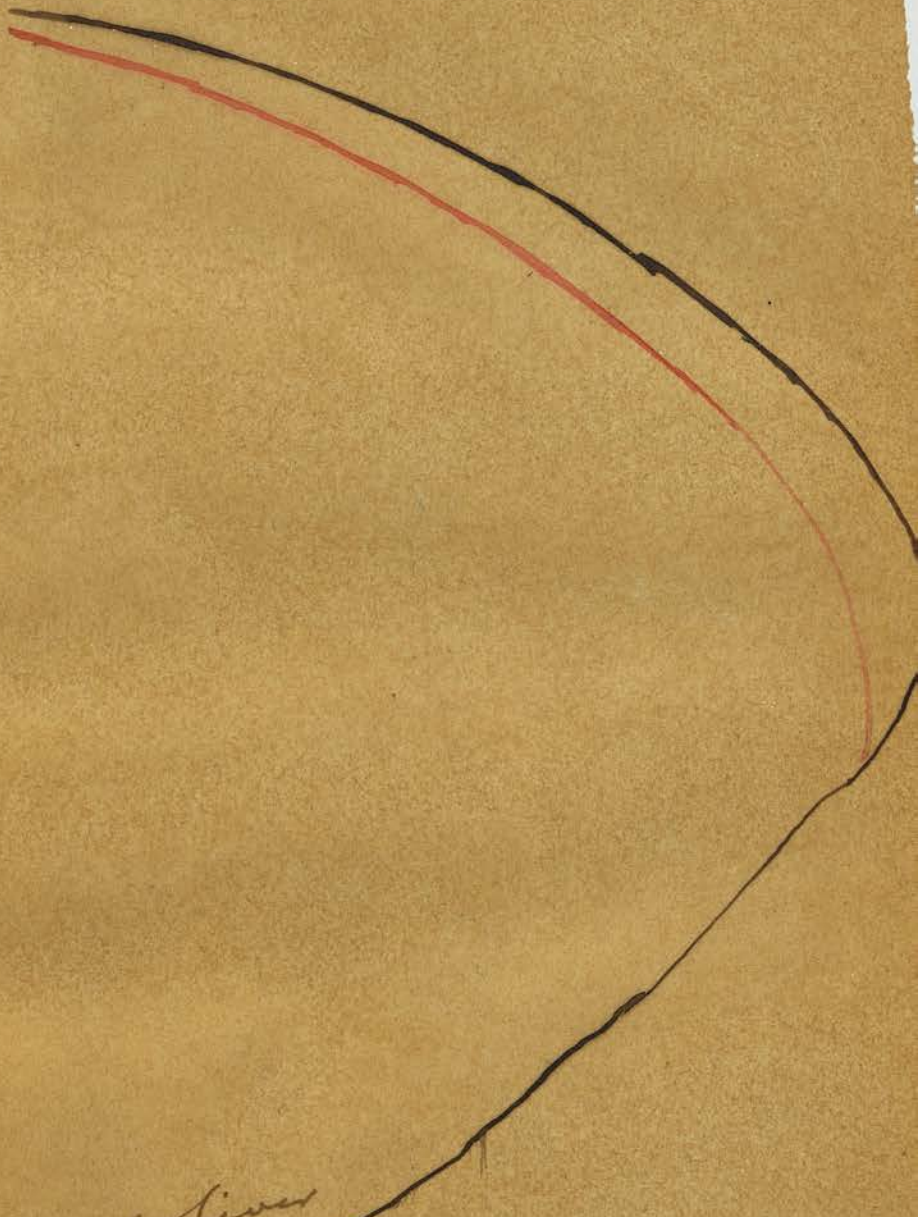




Case 4

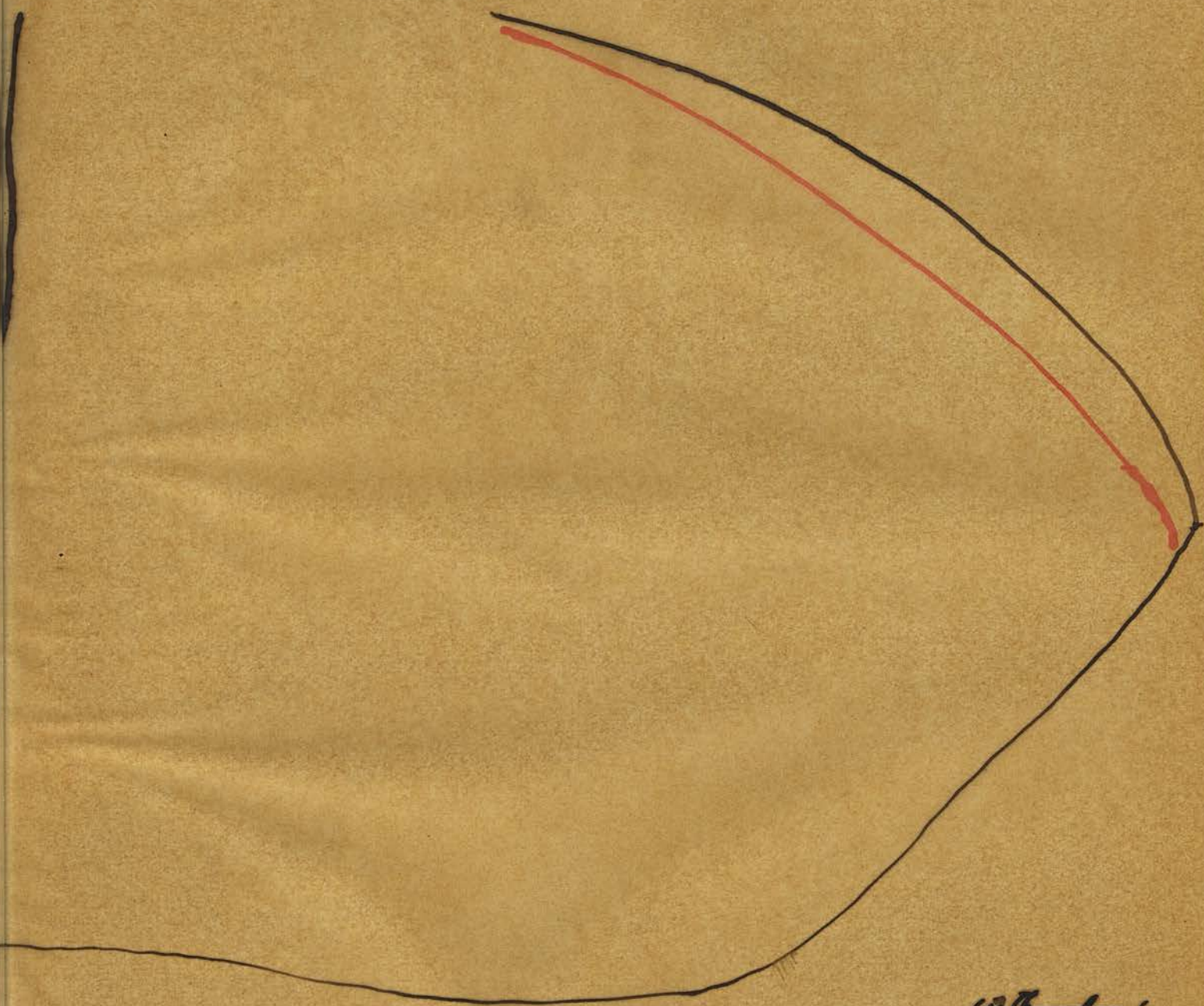
Tracing 4

Before & After 1st
Treatment




Lower Border of Liver

Cause Tracing 5. Before After 10th Days Treatment



Case 4. Tracing 6.

Before After ~~12th days~~
~~12th days~~ ~~12th days~~
12th days 12th days
12th days 12th days



Casey Tracing Final Result.
no change produced by Treatment.

Case V. R. L., aged 46, by occupation a Dock Labourer, came under treatment on Oct. 22nd., complaining of shortness of breath and palpitation.

Patient was an extremely powerfully built man, and on examination his heart was found to be greatly enlarged. There was no valvular lesion, and the enlargement was diagnosed as mostly due to hypertrophy and only in a less degree to dilatation of the heart.

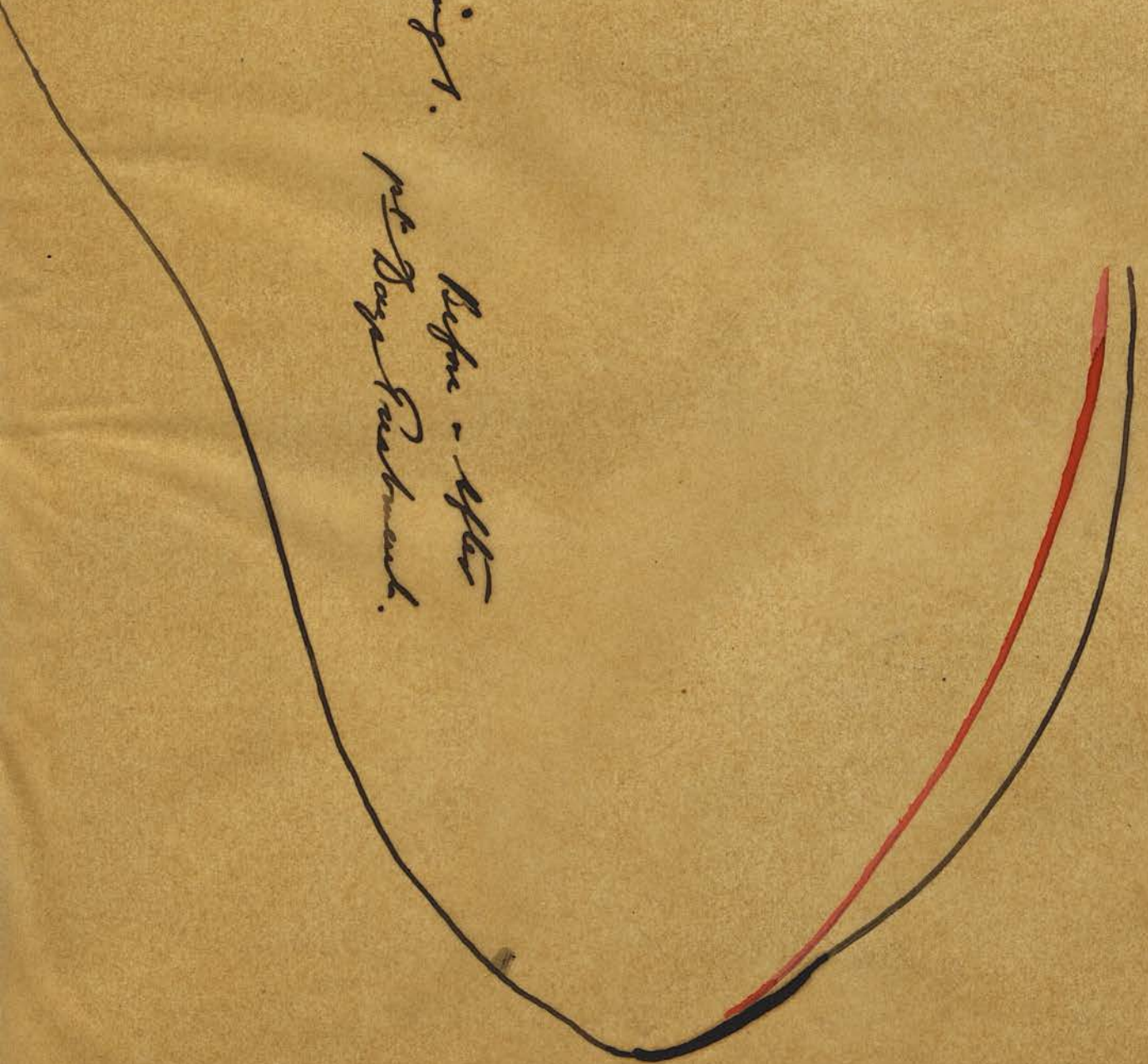
Treatment was begun the next day, and was continued for a fortnight, when the patient left with his general health much improved; his heart greatly reduced in size and much more regular in action. In this case no medicinal treatment was adopted at all, and from the very first no restriction as to ^{exercise} ~~rest~~ was placed upon him; as he was allowed to go about as much as he pleased.

When he left he still complained of slight palpitation on taking any violent exercise, but not to anything like the same extent as when he was admitted.

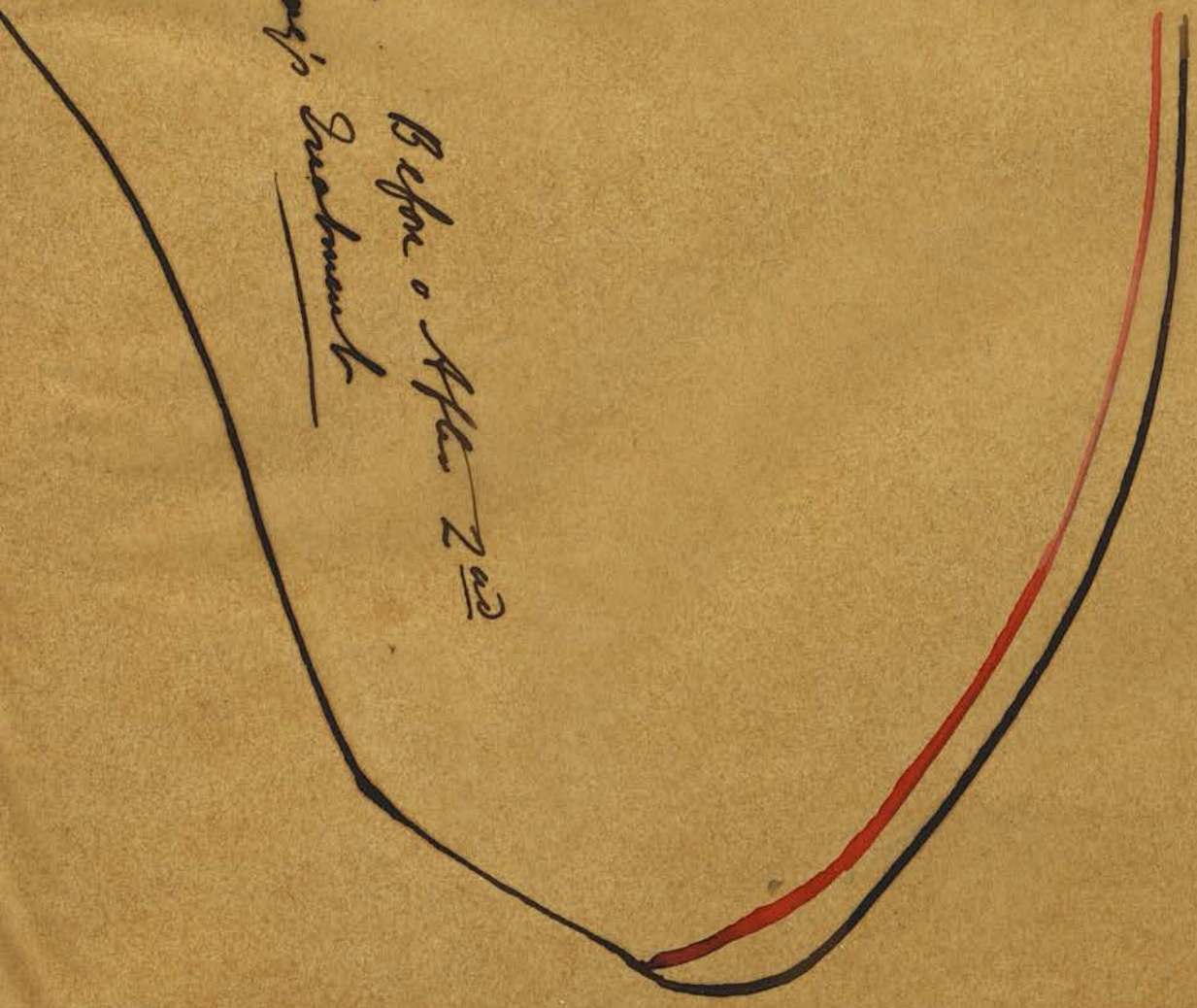
*Small heart.
no change produced by treatment.*

Case 5 - Training 1.

Before - After
1st Day's Treatment.

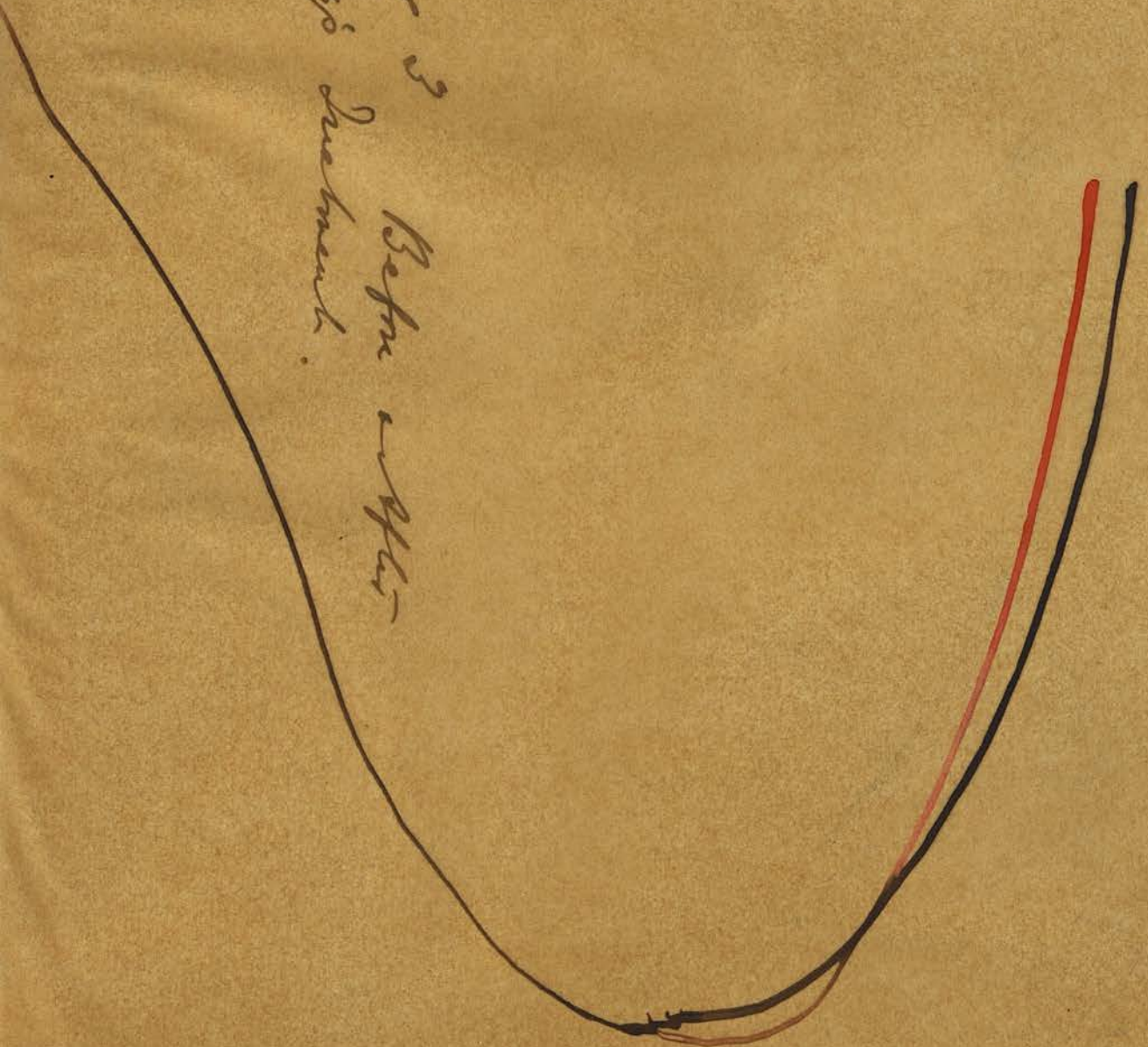


Case 5. Tracing 2 Before & After 200
Day's Treatment





Case 5: Tracing of Both with
4th day's treatment.

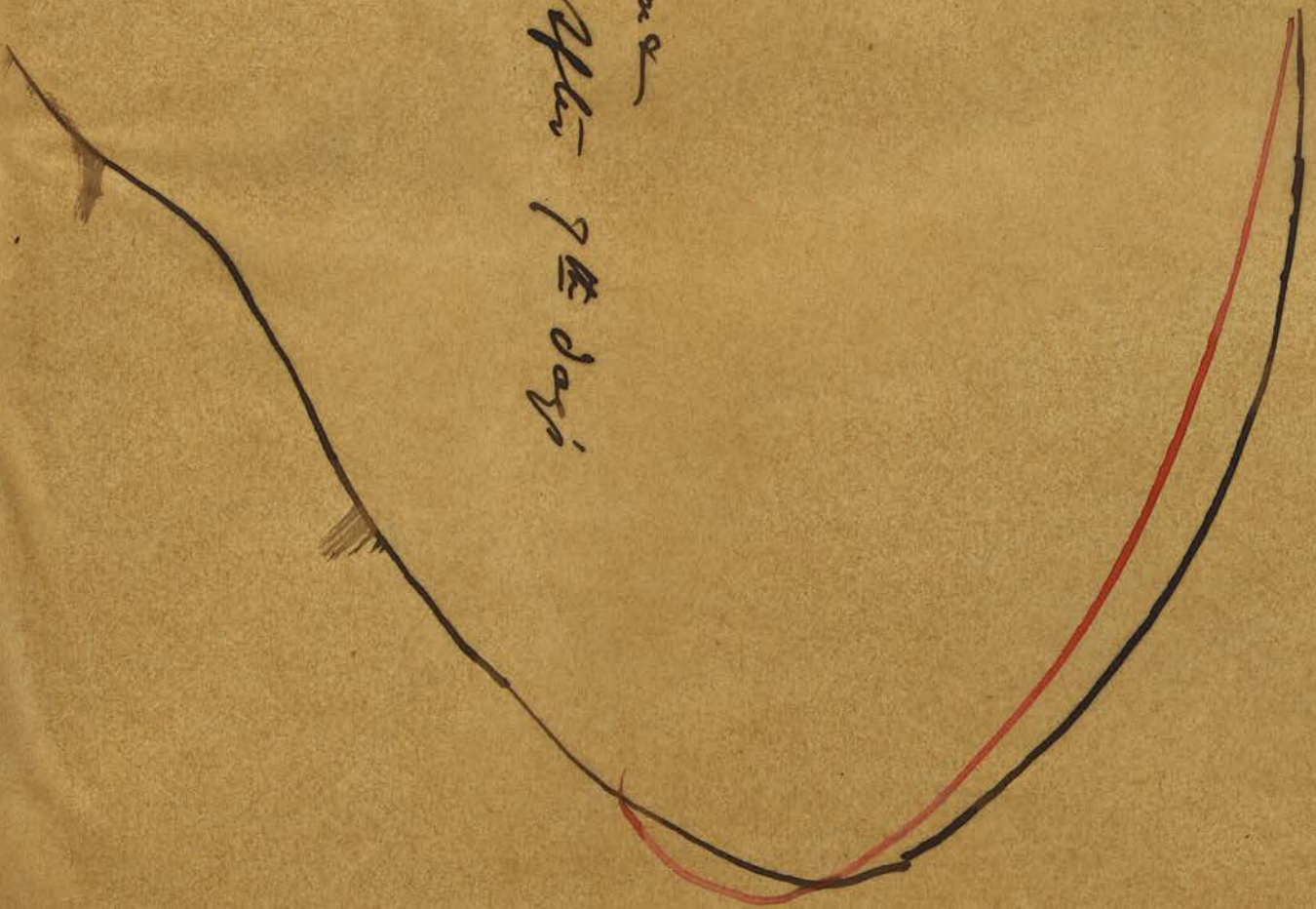




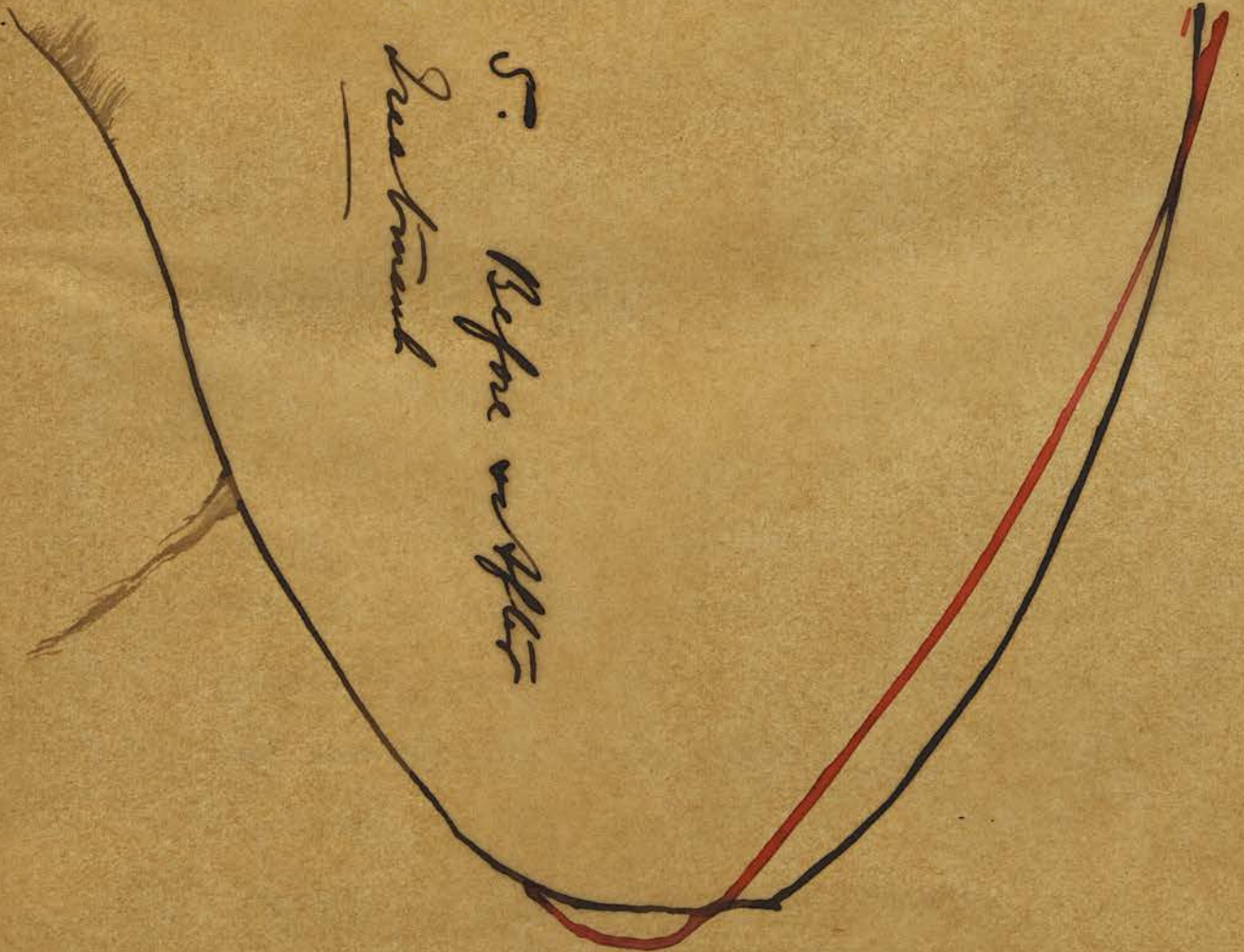
Before

Case 5 - Drawing of a Nerve 7th day

Treatment



Crest facing S. Before with
14th Regt's Emblem



The above five cases have been selected from the entire list, as offering typical examples of the results which were obtained from the treatment. To append the other cases with their corresponding tracings would only confuse and complicate the deductions to be made from their consideration.

It will now be well for a distinct delineation to be set forth of the results gathered from the Investigation, the same plan being followed as that which was adopted for the analysis of the results claimed for the original Nanheim treatment.

A. 1. (Subjective). The impressions and opinions of the patients.

To this heading I do not propose to devote much time, for in the first place, that the patients themselves are pleased with the treatment, and, among the more intelligent class at any rate, believe that they are benefited by it, is not disputed even by its severest critics. And, further, to this it would be easy to ascribe too much importance, for it is a matter of common knowledge that every new cure, if sufficiently advertised, will attract to itself scores of votaries who are prepared

to swear that their particular treatment - and that alone - has produced the most astounding results, but such people, as we are well aware, have no notion of the difference between a post hoc and a propter hoc, and while we may admit their faith as having a bearing of some importance in the production of their cure, we have perhaps but little right to adduce their statements as proof of its reality. Yet it is worthy of remark that there is a somewhat unusual degree of similarity in the verdict of patients differing so widely in mental calibre and social position as those who underwent the modified treatment in the wards of a hospital and those who visited the fountain-head at Nannheim. And this point too I can confirm from my own experience, for although several applications of the treatment upon myself gave negative results with regard to that much disputed point in the alteration in the heart's size, it undoubtedly did produce upon me the rather drowsy and restful condition of mind and body,

of which so many people speak.

A. II. Alterations in appearance and general capability.

Of the genuineness of these changes there can be little doubt; nay, that they do occur during and after the treatment must be admitted. As an illustration, let me quote from my notes of the following case.

P. M., age 37, Hairdresser.

Diagnosis. Dilated heart - mitral incompetence, aortic stenosis and incompetence. Slight oedema of legs - Peripheral neuritis (alcoholic) Mental impairment - and some difficulty in standing erect. This man on entry presented a pitiful picture. To the simplest question it was hard to obtain an intelligent answer. His powers of observation were as obtuse as his powers of apprehension. He was dirty and slovenly in his habits, apparently without being aware of the fact. He was in hospital for two months and for the first fortnight was treated in the ordinary method, with digitalis. This combined as it was with the diet and rest and regularity incid-

ental to hospital life, had, fifteen days after his admission, effected no perceptible change in his condition. The modified physical treatment was then adopted and pursued for three weeks, at the end of which time I find recorded of him. "He is now in greatly improved health, and much brighter and quicker intellectually - in fact fit to resume his occupation. He is quite strong and steady on his legs though his gait is still rather shuffling. He is able to take his share in the ordinary duties of a convalescent in the ward". Of the other changes that were apparent I shall speak more particularly under their separate headings, but the change in his general appearance, behaviour and capability was most marked.

B. 3. Variation in the Pulse.

On this point I think that all observers are agreed. The pulse rate is almost invariably diminished by the exercise, from ten to twenty per cent.

It is also more regular and in every way improved. In this connection I took a

very large number of sphygmographic tracings, with a view to eliminating as far as possible the personal equation of the observer.- But while by their means it was easy to obtain diagrams showing conclusively the diminution in rate, and the increase in regularity, the very points upon which an observer may most confidently place reliance upon his own finger, I was unable either with Dudgeon's instrument or that of Marey, to obtain a rigid comparison of the variation in tension. Throughout the whole duration of the investigation I was perplexed and bewildered by the difficulty, or rather the impossibility of getting these notoriously imperfect instruments to work with any degree of uniformity, and after coming to the conclusion that by working with them I was introducing and not eliminating, additional risks of experimental error, I gave up the attempt altogether. With regard to the frequency the following figures speak for themselves.

<u>Case.</u>	<u>Rate Before.</u>	<u>After.</u>
1.	88.	74.
1.	86.	74.
2.	90.	77.
2.	85.	70.
2.	86.	73.
3.	94.	79.
3.	93.	79.
4.	85.	75.
5.	96.	90.
5.	98.	89.
5.	95.	86.
5.	95.	87.
6.	99.	84.
7.	80.	68.
8.	82.	76.
9.	86.	81.
10.	89.	80.

B. 4. Alterations in the heart-sounds.

Firstly. The sounds themselves may alter in character. Weak sounds may become strong. Impure sounds, yet devoid of murmur become clearer and more distinctly closed; of this there can be no doubt; nor can it any more be denied that in some cases, a previously unheard presystolic murmur is called into existence. That is to say, in other words, the action of the heart-muscle is improved. That this should be so is only to be expected if we admit the general improvement which was postulat-

ed under section A.2. The heart is better nourished, it is relieved of fat. It is no longer battling with a disproportionate peripheral resistance, and in consequence its work is done with greater ease, and greater efficiency.

But, when we come in the second place to ask whether an incompetent valve can be made competent, or a stenosed valve restored to its normal degree of potency we are treading on debatable ground.

Bezley Thorne indeed claims that this can be effected, in one case. (p.74) he speaks of a "well-marked systolic bruit very audible at the base" which after six days treatment by the exercises ceased to be audible, and had not reappeared twelve months later.

In another case (p.75) where well-marked systolic and diastolic murmurs were present he claims that twenty-five days later the systolic bruit was diminished and the diastolic souffle no longer audible.

In yet another case (p.76) there were both aortic and mitral systolic murmurs, and he states that eighty-four days later the basic murmur was much reduced in intensity, while the mitral murmur

was unaltered.

In other cases he claims results of a similar nature, and further quotes a case recorded by Sir Philip Smyly in the "Dublin Journal of Medical Science" Sept. 1894, in which a patient with a patent foramen ovale after his six months treatment showed no abnormality at all in the heart sounds.

It may be noted that in all the cases in which he claims to have abolished or diminished abnormal cardiac murmurs, the claim is limited to restoring, partially or completely, the competency to a valve which may have been incompetent solely in as much as the aperture which is guarded had suffered dilatation in common with the rest of the heart. That this is physically possible may be believed, though as far as my experience goes I have not met with any case in which there was evidence of its having happened. In those cases with which I had to deal, I can find no record of any one in which an organic murmur was substantially altered. We can by this means assist in the establishment of compensation; but that we can restore a stenosed or organ-

ically defective valve to a normal condition I do not believe.

B. 5.

We now come to deal with the alterations in the size of the heart which are so confidently claimed by the upholders of the system, and so stoutly denied by its opponents. Briefly put, it is said on the one hand that after half an hours application of the exercises the area of cardiac dullness is as a rule substantially diminished and that that indicates a corresponding diminution in the size of the heart under consideration. Other observers, on the contrary, tell us that this diminution in cardiac dullness is but of uncertain appearance, and that when it does occur it indicates, either an increase in the bulk of the lungs, or a different phase in a periodic, independent variation of the heart's bulk which has no reference whatever to the ordinary systolic and diastolic cycle of the heart. This latter theory was originated by Heitler of Vienna, and is supported

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by Balfour and Leith of Edinburgh. The majority of observers are, I think, in accord in granting that this diminution in cardiac dullness does as a rule, and especially in what are considered to be abnormally large hearts, ensue upon the treatment. What interpretation are we to place upon it?

In my experience I found it no easy task to get any two observers, however experienced, independently to map out any given heart in agreement. Nor should this be expected, for in each observer we have a variation in fineness of ear and differentiation of sound, and also in strength of percussion. At the edge of the absolute cardiac dullness the heart is covered by an extremely thin layer of pulmonary tissue. As we move outwards the layer of lung which interposes between the heart and the chest-wall becomes gradually thicker, until at length we come to the edge of the heart, as it would be seen by an observer standing directly in front, and here the depth of lung-tissue becomes greatly increased and the solid mass of the heart abruptly ceases. It may be reasonably supposed that a powerful percussion will

elicit a change of note at this point, while one, striking with less force - and thus producing vibrations which do not penetrate so deeply, but also possesses at the same time an ear trained to recognise fine differences in the note, will first detect the presence of the heart at some distance nearer the centre line where the intervening lung is thinner. According to this, the former observer, would consistently map out any heart as being considerably larger than would be the latter, and that this is so, I am convinced from a very considerable number of observations. Being well aware that round this point the battle raged most hotly, I was desirous of having a wide variety of opinions brought to bear upon it, and I accordingly had hearts percussed before the exercises, aswell as after, by two, three or four observers. At first each man mapped out the heart according to his best ability, and then the others were asked to confirm or dispute his decision. A short trial of this, however, convinced me of its absolute inefficacy. Consciously or unconsciously - I believe in the vast majority of cases the latter - The subsequent observers were biassed by the markings

they found already on the patients chest, whether these were the work of other people when the percussion was being practised before the application of the exercises, or their own when it was desired to obtain the result of the exercises applied in the interval. I therefore adopted the following routine, the patient's heart was mapped out by one or more percussors acting perfectly independently of one another. The markings which each observer made, were carefully transferred to tracing paper, the nipples being also traced in as checks. The marks on the patient's chest were then erased, and a fresh delineation obtained by a second percussor, the exercises were then applied, the same percussors then re-examined the heart and again mapped out its borders with no previous marks to influence them.

By this means each delineation of the heart was obtained without the observer knowing how it compared either with his own previous determination, or with that of any other person.

A survey of the results which I obtained by following this method convinced me of its value;

and moreover the testimony thus obtained is far less open to hostile criticism than any other. I found, as I had suspected, that some observers consistently percuss out a heart as larger than others, but in by far the greatest proportion of cases, their delineation, though differing by perhaps as much as an inch or an inch and a half in the transverse diameter of the heart, were yet in agreement in as much as that when the tracings obtained from one observer's delineation of the heart before and after the exercises respectively showed a diminution in the area of cardiac dullness; so did the others; and moreover the amount of diminution on each occasion approximated very nearly to one another. But on the other hand it is suggested this diminution in the area of cardiac dullness is due solely to the fact that the deeper respirations induced by the exercises cause an expansion of the lungs and are no evidence of any change in the size of the heart itself. That the lungs expand in this manner I certainly believe, but I cannot believe that they expand to a degree sufficient to account for the change, that they do not do

so is confirmed by several facts.

In the first place if the lung expanded laterally to the extent of - say - one inch, an amount by which I have frequently found the cardiac dullness to recede, we should then necessarily have a corresponding lowering of the liver, and on account of its wedge-like shape arising in the thorax of the entire heart. I may say at once that in almost every case I found the upper and lower margins of the liver, if not identical before and after the exercises yet so slightly displaced as to show that the expansion of the lungs was not the predominant factor in the causation of the altered cardiac dullness.

Again with reference to the upper border of the heart, I was very early in the investigation struck by this fact that either it remained stationary from the beginning, right through the whole course of the treatment, or else that from the very first it showed a surprising degree of variation in its position, sometimes being raised by the exercises and sometimes lowered. But I did not find that when the upper border was considerably raised it was accompan-

ied by a correspondingly great diminution in the transverse diameter of the dullness, and eventually I formed the opinion that the reaction of the superior border of the heart to the treatment was a question by itself involving other considerations than had elsewhere been concerned.

Another argument against the lung-expansion theory is afforded by the behaviour of the apex beat or cardiac impulse. In some of the hearts under treatment this was at the commencement diffuse, spread over an area of several square inches, and it was not easy to identify either its point of greatest intensity or its external limit. In these cases, however, the invariable result of the treatment was to contract the area in which the impulse could be felt, and that in itself is pretty strong proof of a changed condition of the heart-wall. In other cases the apex-beat was from the beginning only palpable within an area of the ordinary size, a circle of two or two and a half inches in diameter. In several instances, this area lay as low as the sixth interspace and as far out as two inches beyond the nipple, and in no single

such case that I saw was the position of the apex-beat unaffected by the treatment, it was invariably projected diagonally upwards and inwards. This cannot be explained by any degree of expansion of the lungs. There was one other way in which I could eliminate to some extent the alteration in the volume of the lungs. Organs as elastic and sensitive as these must surely return to their previous dimensions within a very short period after such a mild stimulus as that afforded, by the application of the movements in which, be it borne well in mind, the least approach towards breathlessness was prohibited. In every case, therefore, ten minutes at least was allowed to elapse between the cessation of the exercises and the remeasurement of the cardiac dullness. In some cases this interval was greatly increased, and I did not find the inverse ratio between the length of the interval and the variation in the heart's area which I surely had a right to expect were the lungs the sole factors in the production of the case. Nay, more were this the case the heart should surely after an interval of twenty-four hours spent precisely as was

each preceeding twenty-four hours, have returned to its former dimension. But this was not so, the area of dullness had in general, it is true, increased to some extent in the interim, most commonly about two thirds or three quarters of the diminution had disappeared and it is worthy of note that starting on the second and each succeeding day for this progressive limit, each days recession of limit of dullness in itself became less, but remained more permanent. Let me summarize briefly the statements that I have made.

1. Percussion ten minutes or more after the administration of the exercises showed a recession of the limits of cardiac dullness.
2. On the next day before the exercises, the dull area had nearly, but *astarule* not quite, regained its former limits.
3. The amount of diminution was greatest at first, and showed a progressive decrease in amount.
4. The retrograde increase of the dullness during the intervals of the treatment progressively diminished.
5. A point was finally reached where the dull area remained constant within small limits.
6. The movements of the superior border of the heart must be considered apart from those of the right and left borders.

7. The exercises produced little or no alteration in the position of the liver.
8. The position of the apex-beat was modified by the treatment.
9. Cyrtometer tracings of the chest taken in one or two instances, showed no alteration in the shape of the chest.

B. 6. Although chronic disease of the heart may exist for a long time unsuspected by the patient, and is indeed many times discovered only by accident, this is only the case so long as the compensating hypertrophy of the heart has advanced paripassu with the disease. Sooner or later this compensation breaks down, and we have then to deal with a long train of consequent symptoms which cause the greatest discomfort and suffering to the patient and although the relief of their symptoms is often all that we can effect, the original lesion remaining untouched, yet by their relief we can obtain for the patient not only prolonged life but to a great extent freedom from suffering.

Dyspnoea from chronic venous congestion and insufficient oxygenation of the blood; renal

and hepatic derangement and general dropsy and oedema from the engorgement of the great veins of the trunk, all combine to make life a burden. If, however, we can once more re-establish the cardiac equilibrium, and relieve the various viscera, we make it possible for the patient once more to resume an easy and even moderately active life.

That the treatment under discussion in many cases effects this there is an abundance of proof. In the first place, the results which I have detailed above as taking place in the heart itself, of themselves primarily tend to re-establish the necessary compensation. But I maintain that treatment is also serviceable by acting directly upon the accompanying visceral engorgement. The massage and movement of the various limbs properly carried out, directly promote the passage of the blood through the muscles and to and from the heart. The deeper and more regular respiratory movements upon which so much stress is laid by those who have criticised the treatment, are in themselves of the greatest benefit, and it is surely permissible to suppose that the

abdominal viscera are also assisted in getting rid of their surplus blood by the exercises and massage practised upon the trunk itself.

B. 7. In a former paragraph I have enumerated certain functional derangements such as indigestion, constipation, and general mal-nutrition, and have classified them as being possibly "less directly due to the cardiac condition". It is obvious that such a classification may be immediately condemned on the ground that these very symptoms may follow, in the most direct manner possible, from the diseased condition of the heart, and there are doubtless many cases of which this is true, but when it is remembered that indigestion and constipation are perhaps the two very commonest complaints with which the physician has to deal, it is surely fair to assume that in some of the instances in which we find them co-existing with the cardiac deficiency they may themselves have preceded it by a considerable lapse of time, and may indeed have been some varying extent factors in the

production of the latter. It follows then that any method of cure which either obviates entirely, or at any rate diminishes considerably the necessity of pouring drugs into a stomach which has been in a condition of atonicity for many years, and substitutes instead the administration of massage and exercises directly calculated to stimulate the stomach and intestine to reawakened peristalsis is one possessing in that fact alone a very distinct advantage, nor is this advantage merely theoretical when it remembered how badly many stomachs react under the administration of digitalis, which has certainly been heretofore the almost universal panacea for heart disease of any kind.

In more than one of the cases which I had under observation, there was a distinct gain in certain respects from the discontinuation of digitalis, which seemed to have aggravated the existing dyspepsia, and which, in at least one case nearly worried the patient to death, by causing repeated attacks of irritative diarrhoea and colic.

Such then in a brief and all too imperfect fashion, is a summary of the conclusions to which I

came after a period of more than three months spent largely in the investigation of this matter. It is perhaps impossible altogether to eliminate bias on one side or the other, but my endeavour has been to state the facts as they offered themselves to me, in as fair and impartial a manner as possible.

And yet but a small part of the subject has been touched. What is the physiological explanation of these variations - in the bulk of the heart, if that interpretation of the physical signs be admitted - in the area of cardiac dullness if this is held to be all that we can vouch for. Is the heart, too, a much more readily moveable body than most of us have hitherto imagined, and are there other movements proper to it besides systole and diastole? What of this rhythmic periodic cycle of which we now begin to hear whispers? These and many others are questions of great and indeed possibly of vital interest. But they are hardly questions to be settled by the clinician & it is from that point of view that this paper has been written.-

Once more, what is the bearing of this new Treatment, if we admit its efficacy, upon the older

routine administration of Digitalis and other drugs? Here perhaps an opinion may be expressed, and it is that though the new Treatment may - and probably will prove of inestimable value as an adjuvant to the rational exhibition of Digitalis, Strophanthus & Strychnine, yet in the great proportion of cases it will neither be advisable or yet possible to subject the patient to the Treatment in a satisfactory and competent manner . Like so many other "cures" this seems destined to remain altogether beyond the reach of the great majority of our patients, and yet to be of real use and value to those, more favoured of fortune whose means will allow them to give it a full and fair trial.