

NON-SPECIFIC PROTEIN THERAPY IN ASTHMA
AND RHEUMATOID ARTHRITIS.

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NON-SPECIFIC PROTEIN THERAPY IN ASTHMA
AND RHEUMATOID ARTHRITIS.

In the general acceptance of the term - "non-specific protein therapy" - any attempt to treat disease by means of a protein is included, except the use of specific vaccines made from the organisms that are causing the complaint, and the use of minute doses of the proteins to which the patient is sensitive. In the practice of non-specific therapy a large number of therapeutic agents have been used varying from the ancient forms of counter irritation to out present methods of heterobacteriotherapy, of protein therapy, and of the intravenous injections of colloidal metals or other colloid substances.

Here we shall deal chiefly with "Peptone" in the treatment of Asthma and Rheumatoid Arthritis. Peptone is not a protein but a protein derivative. The value of treatment by peptone has been ascribed to the proteoses and albumoses which some forms of it contain, and these protein derivatives form a stage between the whole native protein and the more fully hydrolysed peptone.

Two varieties of Peptone were used.-

(1) Armour's/

(1) Armour's Peptone - 20% sol. or 1 cc. = .2 gms.

It was given by intramuscular injections into buttock.

(2) Witte's Peptone - 2% - 5% sol. It was given intravenously.

Peptone when given in small doses, especially intramuscularly, produced no untoward effect, but when given in larger doses, intramuscularly or intravenously, produced a violent Reaction, termed "Protein Shock". In the treatment of Rheumatoid Arthritis this "Protein Shock" was of paramount importance, whereas in the treatment of Asthma it was of much less importance. Patients may be peculiarly sensitive to Peptone, so it was essential in all the cases, prior to treatment, to determine by the dermal reaction whether or not the patients were sensitive.

The treatment of these two diseases by Peptone will be considered separately. Let us first consider Asthma.

A S T H M A.

Twenty cases were treated with Peptone.

It is well known that Asthmatics are very often sensitive to a foreign protein which may be the actual cause of the Asthma. As a matter of interest the "cutaneous reactions" were done in these cases to find out the nature of the foreign protein to which the patient might react, whether food, bacteria, feathers, hairs, or pollens. In treatment by non-specific therapy these reactions were of little importance, but it might be of interest to note that 12 of the patients were sensitive to one or more of the Cereals, 6 to Hairs and Pollens, and 2 to Bacteria.

The three chief ways of treating Asthma by Peptone are.-

- (1) By single intravenous injections of large doses producing "Protein Shock".
- (2) By the intravenous or intramuscular injections of smaller doses.
- (3) By oral administration.

The second method was the one adopted in all the 20 cases.

METHOD OF TREATMENT.

1. In 15 of the cases Armour's Peptone was used - 20% sol., intramuscular injections into buttock.

Initial dose .2 gms.; 2nd dose .3 gms. given 4 days later; and then succeeding doses at intervals of 6 - 7 days, gradually increasing the dose by .1 gm.

2. Witte's Peptone in 5 cases - 2% sol. given intravenously.

Initial dose 5 min., gradually increasing by $2\frac{1}{2}$ min., at intervals of 6 - 7 days.

STUDY OF CASES TREATED.

Ages of the patients ranged between 18 yrs. and 55 yrs. In about 75% of these cases there was a definite family history of Asthma.-

8 of the cases were of the clean spasmodic type, whereas the other 12 were complicated with permanent bronchitis and emphysema.

The results of the treatment varied in the different cases. There were four types of cases.-

(1)/

- (1) Those who were soon cured by Peptone.
- (2) Those who improved slowly.
- (3) Those who were apparently cured but relapsed, further injections being necessary.
- (4) Those in whom the Peptone met with little success.

1. Those soon cured - 3 Cases.

In this type of case improvement occurred after the first few injections. This was where the Asthma was uncomplicated with any bronchitis or emphysema.

Case 1. Man aged 28 yrs. Duration of Asthma 3 years. Definite family history. By cutaneous reactions sensitive to horse hair and oats. Woke up at nights with typical attacks, great difficulty in breathing etc. Had these attacks all the year round, one almost every two or three weeks. He had an attack just before treatment began.

Began Peptone (1) Initial Dose .2 gms.
 (2) .3 gms. 4 days later, (3) .4 gms. 6 days later,
 (4) .5 gms. 7 days later. No further injections given. He had no more attacks. Was seen 3 months later and had had no further attacks.

Case 2. Male aged 34 years. Duration of Asthma 5 years. Sensitive to foreign proteins - wheat, rice. Family history.

Peptone begun - Initial dose 5 min. of a 2% sol. Witte's Peptone. A definite "Protein Shock" was accidentally produced. Patient felt very ill, restless, cough exceedingly troublesome, marked dyspnoea, headache, temperature 102°. Within 24 hours these symptoms had disappeared and patient felt distinctly improved. He had no further attacks of Asthma. Seen 8 weeks later and had been free from attacks.

There was a third case of this type cured - treated by intramuscular injections, 4 injections being necessary.

In these three cases the Asthma had only been of a few years' duration, the longest being 5 years, and they were not complicated with any bronchitis or emphysema.

2. Those who improved slowly - 8 Cases.

They were of longer duration than the first type, all of them - except 1 - being over 5 years' duration.

They/

They were all treated with Armour's Peptone intramuscularly. The dosage in all of them had gradually to be increased until a slight reaction or slight "protein shock" was produced, before any improvement was noticed. Some authorities advocate that in the treatment of Asthma with Peptone the best results are obtained by producing a definite "Protein Shock". The intravenous case described in the last group rather supports this view.

Case 1. Male aged 40 years. Had typical asthmatic attacks occurring at short intervals. Also evidence of bronchitis and emphysema.

Duration of asthma 10 years. Family history.

Armour's Peptone begun. Initial dose .2 gms. and gradually increased each week until 8 injections had been given, .8 gms. being reached. Patient had slight attack of asthma a few days after 1st injection. After the 8th injection, patient began to complain of headache, nausea, Temp. 99.4^o, Pulse 100, feeling out of sorts, cough became much worse and sputum more copious. After this slight "protein shock". No further injections were necessary. Patient had had no further attacks when seen 6 weeks later.

The/

The other 7 cases were of a similar nature to that described, and in all of them the Peptone had to be pushed before any beneficial effects were noticed. The course was therefore much more prolonged, 6 - 8 injections being necessary. The nature of "Protein Shock" will be described fully when dealing with Rheumatoid Arthritis.

3. Those apparently cured but relapsed, further injections being necessary - 5 Cases.

2 were treated with Armour's Peptone.

3 " " " Witte's "

Case 1. Female, aged 33 years. Had Asthma for 12 years. Occurring during winter every fortnight, at other times once every month or so.

Cutaneous reactions - sensitive to B. proteus, milk, wheat.

Treatment by Armour's Peptone in usual way.

After 4 injections had no further attacks until 2 months later -- she had first a slight attack followed a week later by a definite asthmatic attack. Course recommenced and a full course of 8 injections were given - .8 gms. being reached - For 10 weeks she has had no further attacks.

Case 2./

Case 2. Male, aged 35 years. Definite asthmatic attacks complicated with permanent bronchitis.

Duration of asthma 14 years.

Treated with Witte's Peptone intravenously. Initial dose 5 min. of a 2% sol. - increased gradually until a reaction produced. A fortnight later he had another asthmatic attack. Peptone again started, and several more injections given. Peptone was then stopped.

He had had no further attacks when seen 2 months later.

The intravenous cases in this group showed

(1) that the reaction was more violent than that seen in intramuscular cases,

(2) there was a greater tendency for the Asthma when treated with Peptone intravenously to recur, a further course or courses of Peptone being necessary.

The recurrence always occurred within 2 - 6 weeks after the apparent cure. In one case three separate courses of Peptone were required.

4. Those who met with little success - 4 cases.

In these cases the Asthma was long standing, in three of them since early adult life. The duration ranged from 22 years to 49 years. Furthermore they were complicated with definite permanent bronchitis and/

and emphysema.

Peptone-Therapy was first tried alone, in 1 case intravenously and in the other 3 cases intramuscularly. The doses were gradually increased until a reaction was produced. It must be admitted that the Peptone met with little success. The severity of the attacks was diminished if anything, but the number in most cases was not reduced. A course of autogenous vaccine was then given in each case, followed sometimes by another course of Peptone. In all of the cases no improvement occurred except in one, when the patient was temporarily free from Asthma for 2 months during the course of the vaccine.

As an example of the autogenous vaccine prepared in one case:-

1 cc. approx. contains	
Strept.	100 millions
Staphyl.	500 "

Initial dose .1 cc. gradually increasing by .1 cc. weekly, provided no reaction produced by previous dose.

One course of injections = 6 - 8 injections.

In one of these cases another non-specific protein was used - where peptone had failed and also the autogenous vaccine. This was a mixed coliform vaccine/

vaccine prepared from the patient's intestinal flora. Such a vaccine contained *Strept. faecalis*, *B. coli* and *B. proteus*. The initial dose contained one million of each. A course was tried, but failed like the others.

In passing one interesting point might be noted. It is asserted by some authorities that specific vaccine therapy in Asthma is not only useless but harmful in a great number of cases. This is explained by assuming that the patient may be sensitive to some of the catarrhal microbes, and an injection of the specific organism or organisms to which the patient is sensitive may produce an anaphylactic reaction. In these cases no such reaction was observed after any injection of the specific vaccine.

ACTION OF PEPTONE IN ASTHMA.

Exactly how Peptone worked in curing or improving Asthma was difficult to say. Two explanations might be put forward. (1) It effected the cure of the patient by a mechanism in a way similar to that of the "shock method", or (2) by a process of desensitisation or neutralisation.

The latter explanation is most usually accepted. In the blood of these patients sensitive to a particular foreign protein or proteins a substance is/

is supposed to exist which has been termed a specific adzyme. This has the power of interaction with more of the specific foreign protein to which the patient is sensitive, that chances to gain further entrance to the body. The interaction between the specific adzyme and its protein substrate causes an anaphylactic phenomenon, namely Asthma. Injections of proteins other than the specific protein to which the patient is sensitive must be dealt with in some way by the patient. The process of dealing with this new protein causes the specific adzyme to become so altered that it may have no specific action left. This process whereby the specific adzyme becomes desensitised will result beneficially in curing the patient of asthma.

One cannot be too dogmatic in asserting that Peptone acts by a process of desensitisation. In a great many cases of Asthma the malady may depart when the patient suffers from a temperature due to some infectious complaint, and remains away for a certain period after the fever abates. In having to fight this infection his specific adzyme has become desensitised for the time being, or alternatively we may argue that the temperature acts like a "Protein Shock".

Does/

Does the value of Peptone in Asthma lie in "Protein Shock" or not? In the cases which cleared up after the first few doses of Peptone this process of desensitisation can be readily understood. On the other hand as was seen in the majority of the cases studied, a degree of "Protein Shock" had to be induced before any improvement occurred. It would therefore appear that the improvement was either due to a gradual process of desensitisation, or that "Protein Shock" alone caused the improvement as was borne out by the cure resulting from a single intravenous dose of Peptone. It will be seen later that the mechanism of "Protein Shock" may be a process of desensitisation or neutralisation also. Is there any relationship between the process of desensitisation already described in Asthma, and the process of desensitisation that is supposed to occur in "Protein Shock"?

TREATMENT OF "RHEUMATOID ARTHRITIS"
WITH PEPTONE.

The term "Rheumatoid Arthritis" includes Rheumatoid Arthritis Proper and Osteo-Arthritis. A study of 25 cases was made, 18 being cases of Rheumatoid Arthritis Proper and 7 being cases of Osteo-Arthritis.

Mention will also be made of a case of Subacute Arthritis treated with Peptone.

METHOD OF TREATMENT.

As in Asthma most of the cases were treated with Armour's Peptone intramuscularly, 5 only were treated with Witte's Peptone intravenously.

(1) Armour's Peptone - 20% sol.

Initial dose .5 gms., gradually increasing the dose weekly by .1 gm. or .2 gms. until a very violent reaction or "Protein Shock" was induced.

(2) Witte's Peptone - 5% sol. used.

Initial dose .1 cc., gradually increasing until "Protein Shock" induced.

As in cases of Asthma a cutaneous reaction was done prior to the commencement of the treatment determining whether or not the patient was sensitive to Peptone. In all of the 25 cases they were non- /

non-sensitive.

The value of Peptone Therapy in Rheumatoid Arthritis lay in the production of the "Protein Shock". What is "Protein Shock"? By it is meant the reaction produced in a "diseased" individual after an injection of Peptone. This reaction may be subdivided into a General and a Focal Reaction. The reaction varied with the dosage used, with the method of application whether intramuscularly or intravenously, with the number of previous injections, with the physical condition of the patient, with the duration of the disease from which the patient was suffering, with the temperature of the patient at the time of the injection and other individual factors. The reaction varied from a mere febrile reaction to an extreme shock picture. The dosage used for the production of "Protein Shock" varied in the different cases, and will be seen in the study of the cases made later. With the intravenous injection the reaction was usually more intense. Before a study of the cases is made the two reactions, General and Focal, occurring in "Protein Shock" will be described in detail.

GENERAL /

GENERAL REACTION.

The evidence of the General Reaction included (1) the Chill, (2) Fever, (3) Sweat, (4) Rapid Pulse, (5) Nausea and Vomiting, (6) Headache, (7) Nervous Irritability, (8) Leucocytosis.

1. The first symptom of the "Protein Shock" was usually a rigor or shivering. This usually set in from $\frac{1}{2}$ hr - 2 hrs. after the injection. The degree of reaction varied. In a mild case of "Protein Shock" it was not noticed, but wherever the shock was at all moderately severe it was observed without fail. It passed off in a few minutes.

2. The Temperature.

In all of the cases this was the prominent and constant feature, the change in the Temperature Curve. With the subsidence of the Chill, the Temperature of the Patient usually commenced to rise. In some cases of mild reactions it would rise 1° - 2° F., but in most cases where moderate reactions were produced it would reach 102° - 103° . In one case of a violent reaction it reached 103.8° . Within 9 - 12 hours after the injection the maximum temperature was reached, which gradually fell by lysis and reached normal within 18 - 24 hours. The rise in temperature depended/

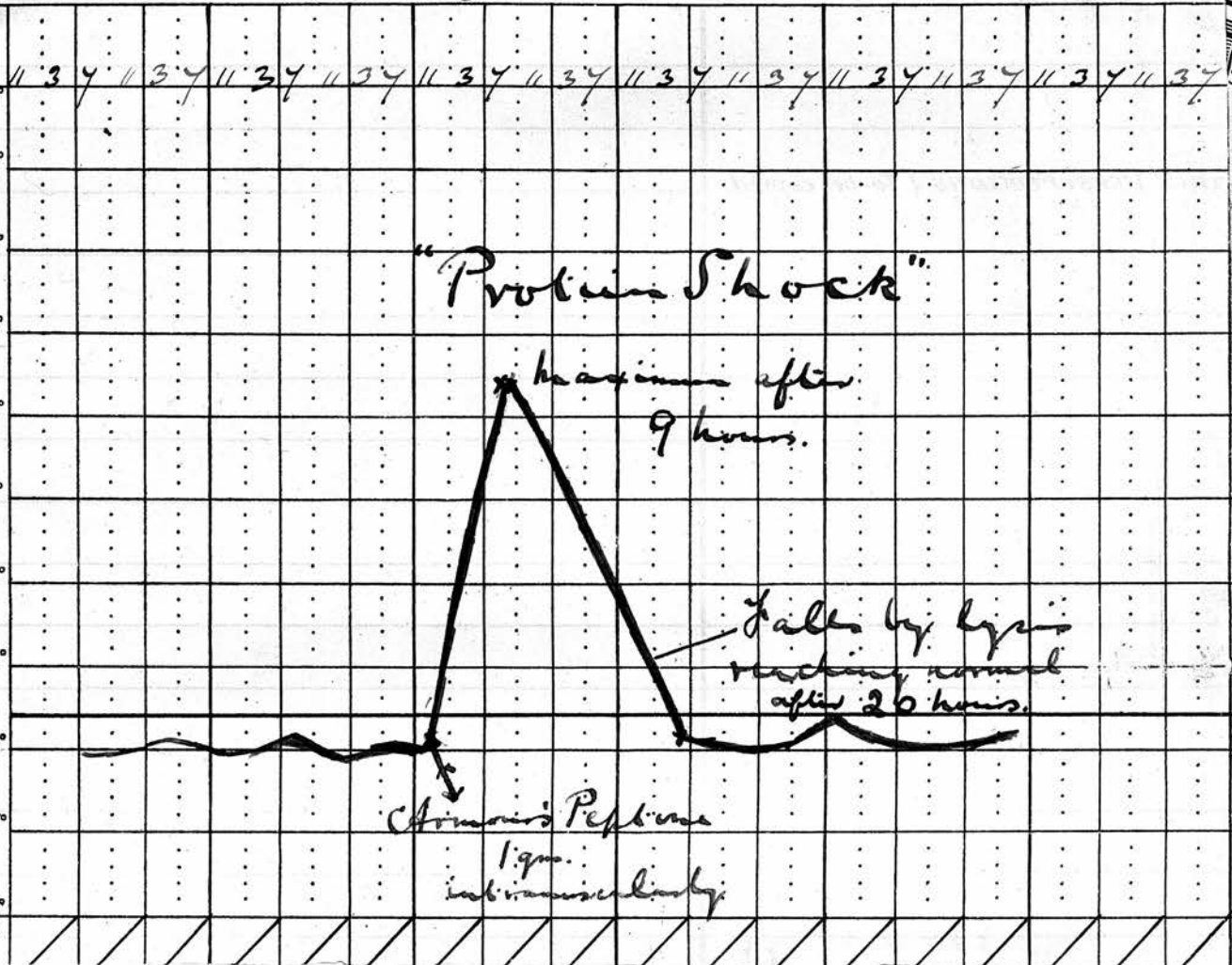
"Rheumatoid Arthritis" Disease

Name

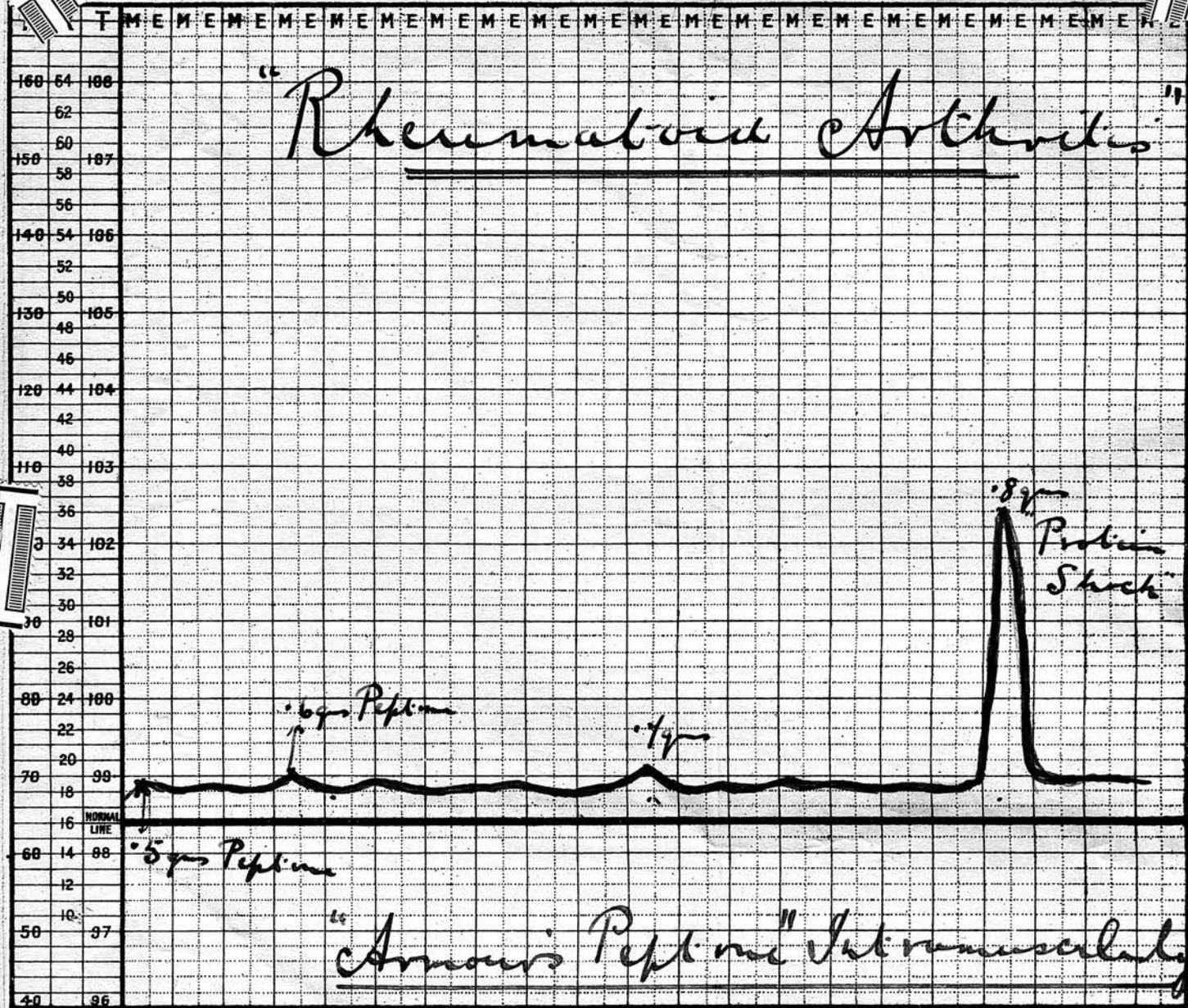
Age

TEMPERATURE FAHRENHEIT'S SCALE.

Pulse



Rheumatoid Arthritis



Arnoid's Peptide Intramuscularly

BOWELS																					
URINE																					
DATE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
DAY of DISEASE																					

PULSE IN RED. RESPIRATION IN GREEN. TEMPERATURE IN BLACK.

depended to a large degree on the individual as well as the dosage. (See Temperature Charts.)

3. Pulse and Blood Pressure.

Coincident with the Temperature Reaction the frequency of the Pulse was increased. The increase in frequency varied from 25 - 45 per minute. The quality of the Pulse was not altered, and in no case was any arrhythmia noticed.

In a few of the cases the Blood Pressure was taken at the height of the Fever and after the Fever had subsided. When the Fever was at its height the Blood Pressure was found to be increased by about 5 - 10 mm., whereas after it had subsided the Blood Pressure had returned to normal.

4. Sweating.

This was found in about 75% of the cases occurring after the rigor and when the Temperature commenced to rise.

5. Nausea and Vomiting.

Only present in 2 cases.

6. Headache.

Observed in most of the cases and was worst at the height of the Fever.

7./

7. Leucocytes.

In each of the cases a white blood count was done and also a blood film made for a differential count. Two sets of observations were made. In one set comprising 16 cases a leucocytosis was noted beginning shortly after the injection and persisting for 2 - 3 days (after it). The average leucocytosis was 15 - 20,000 leucocytes. In the other set comprising the remaining 9 cases a leucopaenia was observed during the fever, and then a leucocytosis - varying from 15 - 30,000 - commenced, when the fever was abating and continued for 3 - 4 days.

A differential count showed that in all of the cases the increase in leucocytes was a polymorph one, both relative and absolute. The other cells were more or less normal in numbers. The films showed no abnormal cells.

8. Nervous Irritability.

The patient was usually exceedingly irritable after the injections, and more sensitive to pain.

9. Urine.

Examination of the urine in all the cases revealed no abnormal constituents either macroscopically, microscopically, or chemically.

10./

10. Weight of Patient.

No change in weight was noted during the course of injections.

FOCAL REACTION.

Just as there was a General Reaction after an injection of Peptone, so it was observed that the affected joints became very much inflamed. There was an increase of pain, tenderness, and hyperaemia. This Focal Reaction - as it is called - was of a Diphasic Character. The first phase was the Negative Phase when the evidences of inflammation were increased - pain and swelling augmented and the function of the joints impaired. This phase lasted all through and after the Fever Stage, on an average about 24 - 48 hours. This was followed by a Positive Phase during which there was a progressive diminution of the inflammation, until the "pre-injection stage" was reached or more often passed because in the majority of the cases treated the joints became less painful and more mobile than they had hitherto been. This Positive Phase might be called the "curative stage". Therefore in treatment we should like to make the Negative or Inflammatory Phase as short as possible, and the Positive Phase relatively intense and/

and protracted. But it was proved from a study of these cases that the degree and extent of the "Positive Phase" was closely dependent and correlated with the Negative Phase.

MECHANISM OF THE REACTION.

The evidence of the reaction of the patient - the chill, fever, sweat and leucocytosis - might all be assumed to have some bearing on the therapeutic result. We know from experience that a thorough sweat frequently cuts short and relieves the symptomatology of many diseases, and also that an intercurrent febrile course often favourably influences a pre-existing disease process. But none of these observable reactions seemed sufficient to account for the striking effect that occasionally followed these injections of Peptone. Many theories have been put forward, but only the two most important will be mentioned.

The first theory supposes that this reaction stimulates all the cells of the organism to greater activity in the production of either specific substances, anti-bacterial in character, or merely increases the General Reaction to intoxication by speeding/

speeding up the mechanism of detoxication.

The second theory is the one more generally accepted. The blood of a normal person has various proteolytic enzymes and antiferments. It contains an enzyme, protease, which has the power of breaking down the larger peptone fragments to smaller and non-toxic amino-acids. The antiferment is a substance which neutralises or rather stops the actions of these ferments. During the intoxication which results from bacterial infection, either acute or chronic and the general stagnation of cell activity that takes place, these enzymes become increasingly inactive with the result that split-protein poisons are circulating through the blood. With the production of "protein shock" these enzymes become greatly increased and activated so that the split-protein poisons are quickly hydrolysed and removed from the circulation.

At present there are many other theories besides the above put forward to explain the beneficial effects of "Protein Shock".

STUDY OF THE CASES.

Now that "Protein Shock" has been described let us make a study of the cases treated. They will be divided/

divided into two main groups.-

- (1) Rheumatoid Arthritis Proper - 18 cases.
 (2) Osteo-Arthritis - 7 cases.

Such a division is necessary, because the results were so different in the two groups.

Before taking up these two groups a case of Subacute Arthritis treated and cured with Peptone will be described.

Case. Female, aged 34 years. History of 4 previous attacks of acute rheumatism. Joints involved were those of both wrists and the metacarpophalangeal of both hands; Temp. varying from 99° - 100° . The case was treated for 3 weeks with salicylates, but the temperature did not fall for any length of time and the joints remained more or less in the same painful condition.

Armour's Peptone begun. Initial dose .3 gms., gradually increased. After the 3rd dose, .5 gms, a reaction was induced. The joints cleared up, the temperature fell to normal, and the pain quickly disappeared from the joints.

1. Rheumatoid Arthritis Proper.

Of the 18 cases belonging to this group,

(a)/

- (a) 2 were cured.
- (b) 6 were markedly improved.
- (c) 8 were slightly improved.
- (d) 2 were not benefited.

(a) By the term "cured" was meant that the joints became free from pain, and their mobility returned almost to normal.

The 2 cases cured included 1 male and 1 female. In both cases the sites of the rheumatoid arthritis were the metacarpo-phalangeal joints and the phalangeal joints of both hands. The affected joints showed swelling, signs of effusion. There was pain on movement and limitation of the movements.

Armour's Peptone begun. Initial dose .5 gms. In the case of the female 2 doses were given, and with the 2nd dose a definite shock was induced. In the case of the male 4 doses were required before a reaction took place. Immediately after the reaction the positive phase set in with gradual improvement until within 2 - 3 days both patients were free from pain and able to move the joints freely. These cases were kept under observation from 8 - 10 weeks, and there was no recurrence.

- (b) Markedly improved - 6 cases.

By this was meant that the affected joints were practically/

practically free from pain, but that the normal movements were not fully restored. All these cases were of longer duration than those of the first group, and definite changes of deformity had occurred in the joints. There were signs of definite wasting in the muscles around the affected joints, changes in the bones themselves, and also some trophic changes in the skin over these joints.

Case 1. This was a case of the mono-articular variety following injury.

Man aged 40 years. Injury to shoulder joint 1 year previous without any fracture or dislocation of the bones. Since then the joint had become painful, and the movements exceedingly limited. X-rays showed rheumatoid changes in the joint with probable adhesions. There was distinct limitation of the abduction and rotation movements, and to a less extent of flexion and extension.

Armour's Peptone begun. Initial dose .5 gms. After each dose, although no definite shock was induced, there was distinct improvement in the movements of the joint. With the 5th dose there was a violent reaction, temp. 103° , and the joint became extremely inflamed, tender, swollen and painful, the patient being unable to get a sleep that night. Then followed the Positive Phase with the marked improvement.

Within/

Within 48 hours the movements gradually improved, and the joint was practically free from pain.

The only movements which remained slightly limited were abduction and rotation. Patient was discharged 6 weeks later, and on enquiry 3 months afterwards there had been no relapse and the patient was able to follow out his occupation of a Railway Guard.

The other cases were of the "hand-and-wrist variety", and showed marked improvement under treatment. There were no recurrences in any of the cases.

(c) Slightly improved - 8 cases.

By this was meant that the pain in the affected joints became less marked, but distinct limitation of movements remained. In these cases the deformity of the joint was more marked - they were more advanced cases.

It must be admitted that one case belonged to this section where the deformities were slight, and where the disease appeared to be in the earliest stage, yet it resisted all efforts to Peptone Therapy, and the success was practically nil.

To this group belonged a few cases in which there were slight osteo-arthritic changes, but not marked enough to be classified in the osteo-arthritic group.

The/

The doses of Peptone were increased gradually in all of these cases until a definite reaction was produced. The joints certainly passed through a Negative Phase but the Positive Phase was short. Recurrences occurred in 3 of the cases in 2 - 4 weeks after the slight improvement - when Peptone was again begun, and "pushed" without success.

(d) No improvement - 2 cases.

There were 2 cases which showed no improvement. They remained as painful and as "stiff" as they had been before the commencement of the treatment. These cases were more advanced, and of longer duration than any of the others mentioned.

2. Osteo-arthritic Group - 7 cases.

- (a) Cured - none.
- (b) Markedly improved - 1 case.
- (c) Slightly improved - 4 cases.
- (d) No improvement - 2 cases.

It will be seen that Peptone Therapy in this group met with little success. Bony changes had occurred, lipping of the bones and marked deformity of the joints. These 7 cases included 4 male adults and 3 female adults.

JOINTS INVOLVED.

Vertebral Cases.

There were 2 vertebral cases, 1 cervical and 1 lumbar. Both of them showed no improvement under Peptone.

1. Cervical Case.

Man aged 57 years. Stiffness of neck of 13 years duration. Definite osteo-arthritic changes in lower cervical vertebrae as seen by X-rays.

Unable to flex or rotate neck. Armour's Peptone - 6 injections given and although "protein shock" produced, it had no beneficial effect whatever.

2. Lumbar Case.

Man aged 38 years. Sciatica left leg - duration 2 years. Osteo-arthritic changes in lumbar vertebrae as shown in X-rays. Witte's Peptone given intravenously - 5% sol. "Protein Shock" produced with no good result.

Hip-Joint Cases.

Mono-articular variety of osteo-arthritis - 3 cases. All of them showed slight improvement with Peptone. There was less pain and increased mobility in the joint. Armour's Peptone used in 2 cases and Witte's Peptone in 1 case.

Knee-Joint./

Knee-Joint.

1 case - Mono-articular osteo-arthritis in right knee following injury. Slight improvement with Witte's Peptone.

Hand.

1 case - Wrist and fingers of both hands involved. Markedly improved. Armour's Peptone given - after 4 injections reaction produced. Thereafter improvement set in with increased mobility and lessened pain in the affected joints. There was no recurrence in the joints after 8 weeks.

ACTION OF PEPTONE IN RHEUMATOID ARTHRITIS.

The mechanism that is involved in the recovery of the patient is still quite obscure. We have seen that an injection of Peptone causing "Protein Shock" brings about a General and a Focal Reaction, and that the mechanism of recovery hinges on this "reaction". As a result of this "reaction" the local tissues in the affected joints may become immune to the toxic effect of the bacteria still alive in the focus, or
it/

it may mean a "neutralisation or hydrolysis of split-protein poisons" present in the circulation and to which the local tissues have heretofore been sensitive. The latter explanation is the more probable, and as it has been studied in detail under "Protein Shock" we shall not discuss it further.

S U M M A R Y.
-----RESULTS IN ASTHMA.

In summing up the results of Peptone Therapy in the 20 cases of Asthma:-

1. On the whole the results were good.
2. That the pure spasmodic case uncomplicated by bronchitis responded best of all to Peptone, and cure was certain in almost every such case.
3. That the shorter the duration of the Asthma the more likelihood of success there would be.
4. Another point not referred to already - where the family history of Asthma was marked the more difficult was it to cure by Peptone.
5. Intramuscular injections of Armour's Peptone gave better permanent results than the intravenous Witte's Peptone, although the latter in certain cases was extremely successful after a single intravenous injection.
6. "Protein Shock" when severe usually benefited cases of Asthma little, especially when the patients were sensitive to foreign proteins.

On/

On the other hand a slight degree of "protein shock" was necessary in long standing cases of asthma and in those which did not yield to the first few doses of Peptone.

RESULTS IN RHEUMATOID ARTHRITIS.

1. That where the Rheumatoid Arthritis was poly-articular not all of the affected joints benefited to the same extent - with the exception of those two cases of cure mentioned. Some of the joints showed marked improvement, while at least one or more were only slightly benefited.
2. The maximum number of injections given was 8 intramuscular 1.5 gms. of Armour's Peptone being reached.
3. The sharper the General Reaction and consequently the more intense the Focal, the better the clinical result.
4. Some authorities state that unless a sharp reaction is elicited at the first injection subsequent injections will as a rule be followed by little or no clinical improvement. In the cases studied/

studied the reaction did not usually follow until the 4th or 5th injection, and the results were fairly satisfactory.

5. Where definite bony changes or ankylosis had occurred Peptone Therapy met with little or no success. The longer the duration of the disease the less likelihood was there of success.
6. The tendency to immediate recurrence was not great. Most of the cases were seen 2 - 3 months later. Two cases were seen 8 months later - who had benefited with treatment - and there had been no recurrence. In those cases where recurrence had taken place, "protein shock" when again induced had little or no beneficial effects.

PEPTONE-THERAPY

IN ASTHMA AND RHEUMATOID ARTHRITIS COMPARED.

1. Results compared.

	Cured.	Markedly Improved.	Slightly Improved.	Not Improved.
Asthma	50%-60%	20%	-	20%
Rheumatoid Arthritis.	8%-10%	25%-30%	40%-50%	15%-18%

From these results there can be no doubt that Peptone is of more value in Asthma than in Rheumatoid Arthritis. In Asthma about half of the cases were cured and free from attacks. The percentage of cure in Rheumatoid Arthritis was small. If these cases of Arthritis had been treated earlier, then the percentage of cure would certainly have been higher. It was just as in Asthma, the more marked the secondary changes the less chance was there of success.

Another point observed - that Asthma was either cured or greatly improved with Peptone, or else it was not improved at all. In Rheumatoid Arthritis although the cases cured were few, a large percentage was markedly improved or slightly improved. The percentage of "no improvement" was smaller than in Asthma.

There was a greater tendency for recurrence after treatment in cases of Asthma than in cases of Rheumatoid Arthritis.

In Asthma	-	20% - 25%
In Rheumatoid Arthritis		12% - 15%

2. Actions compared.

In Rheumatoid Arthritis one endeavoured to produce a definite "Protein Shock", whereas in Asthma it was avoided if possible and only in resistant cases was/

was a mild reaction induced. Many authorities advocate the same type of reaction in both diseases, but as has been seen in the cases of Asthma - and in accordance with the views of other authorities - a violent "protein shock" benefited the cases little and recurrences were more apt to occur.

We have seen that a process of neutralisation or desensitisation occurred in "Protein Shock" and also that a process of desensitisation occurred in asthmatics treated with Peptone. Some definitely state that in Asthma it is a process of desensitisation and in Rheumatoid Arthritis it is one of "Protein Shock", in other words asserting that "Protein Shock" is not a process of desensitisation in any way related to that occurring in Asthma.

Supposing we accept the two possible theories already put forward in Asthma and Rheumatoid Arthritis respectively and compare them. In Asthma it was said that an "adzyme" was present in the blood of an individual sensitive to a foreign protein. What the chemical nature of this adzyme is, no one can say. In Rheumatoid Arthritis there were supposed to be split-protein poisons circulating in the blood which were the result of bacterial infection. When an injection of Peptone was given in Asthma, it interacted with/

with the adzyme desensitising it, and in Rheumatoid Arthritis it interacted with the split-protein poisons desensitising them. The interaction might produce "Protein Shock", or it might not, depending on certain factors. When "Protein Shock" was produced in Rheumatoid Arthritis" the maximum point of desensitisation seemed to be reached, whereas in Asthma this point might be reached - with cure - without "Protein Shock" being induced. Thus it would appear that the action of Peptone in the two diseases is closely related, and the principle of the mechanism is more or less the same in both.

In both diseases the best results occurred when Peptone was used early in the disease. From the study of these cases it will be seen that Peptone Therapy offers a very important and successful therapeutic measure in two conditions which have been so resistant to all kinds of former treatment. This new treatment is still in its infancy, and requires judgment, and careful attention on the part of the physician. The great disadvantage of its use at present is the great discomfort and anxiety it may cause the patient especially in these cases of "Protein Shock". It is hoped, that in future some non-specific protein be discovered/

discovered that will give the same therapeutic effect without the severe reaction. As yet no such substance has been found.

