On the Relation of the Throat to Rheumatic Fever, and Allied Conditions.

Being a Thesis Submitted for the Degree of M.D. in the Faculty of Medicine in Edinburgh University.

by

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On The Relation of Sore Throat to Rheumatic Fever and Allied Conditions.

Ever since I commenced the practice of medicine in the year 1875, I have been struck with the remarkable frequency of Sore Throat as an antecedent of Rheumatic Fever, and have made it a point to inquire into the history of cases of Rheumatic Fever coming under my notice. The subject naturally suggested itself to me as a suitable theme for a thesis, and for some time past I have kept records of cases coming under my notice. Having the clinical material of a large Poor Law Infirmary at my command, I have been able to obtain a fairly large number of cases, and tabulate some statistics bearing on the subject of inquiry. Before proceeding to submit these data in kind of my own, I will sketch out to some extent the work that has already been done on this subject. Here I might point out that in the text books on general medicine, and even in many of the treatises on Rheumatic Fever, scant, and I think inadequate notice is taken of the throat factor while dealing with the subject of Rheumatic Fever. It is the object of...
of this thesis to show that the element of Sore Throat in connection with Rheumatic Fever is an all-important one in every way, and at least so from a prophylactic point of view.

Historical.

Hippocrates is generally accredited as the first to take any note of Sore Throat in connection with Rheumatic Fever, but according to Archibald E. Garrod, this credit is due to a mistranslation, and there is, as a matter of fact, no such reference in the writings of the Father of Medicine. Indeed, we have to come down to the end of the last century for any definite reference to the subject in medical literature. In 1777, we find Stoll (Ratv Medecin) pp. 84-89, vol. II, speaking of a Rheumatic Angina, and in 1805, Raynaud (Clinical Study of Acute Rheumatism) mentions Sore Throat as an occasional antecedent of Rheumatic Fever and dwells on the importance of the throat condition. Poncet de Donillien in 1840 (Traité du Rheumatisme" p. 248) refers to a Rheumatic Angina accompanying Rheumatic Fever. In 1865, Leiner made Rheumatic Angina the subject of his graduation thesis, "Thèse de Paris" and wrote a very valuable monograph. In 1865 or 1866, John Ogle wrote on Rheumatic Sore Throat.
In 1868 Lacépède devoted a chapter in his "Traité des Angines" to Rheumatic Angina, in which he drew attention to the injection and swelling of the pharyngeal wall and palate, and whilst he agrees that the tonsils may become involved, he believes that this is only an extension of the inflammation and that they are not primarily involved.

In the same year (1866) Lennox Brown in his Treatise on Diseases of the Throat and Nose drew special attention to Rheumatic Tonsillitis, and he was as a matter of fact the first in this country to lay emphasis on the close relationship that exists between Acute Tonsillitis and Rheumatic Fever. In 1866 Benjamin Bell wrote two papers on this subject ("On Rheumatic Tonsillitis"), and Ducreux ("Décrit de Med. et Chir. Prat. Article Angine") described Rheumatic sore throat. Amongst other contributors were Mercier ("Bull. de la Soc. de la Suisse Romande" 1870); Halévy ("Voyage de Paris" 1870); Pepponier ("Memoire de Paris" 1876); Kingdon Fowler ("Lancet" 1879, p. 758); Waigren ("British Medical Journal" 1879, Vol. II, p. 680); William Stewart ("British Medical Journal" 1872, Vol. II, p. 930); Mantle ("British Medical Journal" 1875, Vol. II, p. 760); Fullard ("International Clinics" Vol. II 1878); Reckles ("American Journal of Medical Science", Jan. 1870); Abrahams ("Medical Press & Circular", Feb. 1879).
Amongst the text books on Rheumatic Fever, that by Dr. Archibald E. Carrod devotes most attention to the subject.

Important statistical evidence on the question was collected by the Collective Investigation Committee of the British Medical Association in 1883, and published in the "British Medical Journal" of December 8 of the same year. The evidence was affected to somewhat weakened by the great number of medical men reporting, and the consequent want of satisfactory uniformity in their reports.

At the British Medical Association Meeting at Leeds in 1884 (Laryngological Section) there was an interesting and important discussion on Rheumatic Fever and Sore Throat, a report of which will be found in the "British Medical Journal" for September 14 of the same year.

Classification of Rheumatic Sore Throat.
Throughout medical literature on this subject we find Sore Throat considered in three different ways.
(A) As one of the Initial or Accompanying Symptoms of Rheumatic Fever.
(B) As an independent manifestation of the Disease of Rheumatic Fever.
(C) As the Source of Infection in Rheumatic Fever.
(A) Sore Throat as an Initial or Accompanying
Symptom of Rheumatic Fever.

This is the only form of sore throat referred to by
the earliest writers on Rheumatic Angina. A knowledge
of the present form only came out about the
middle of the present Century, and it is little
more than a decade ago since the third
view was advocated.

In modern text-books (e.g. Dr. "Practice of
Medicine" 1849) this form of sore throat is usually
described as a tonsillitis, but in my experience
it is much more common. An acute Pharyngitis
Jenner in his Therio (Thése de Paris 1865) has
described it as such, and I find his clinical
description a very true one. He describes it as
Commencing suddenly with acute pain, increased
by swallowing, and often accompanied by stiffness
in the neck. There is an erythematous redness at the
back of the throat, and edematous swelling of
the mucous membrane especially of the orals,
accompanied sometimes by more or less swelling
of the tonsils. Jenner (as did Trousseau, Becquer
and others) laid much stress on the great pain which
attends the sore throat of Rheumatic Fever, and which
is out of all proportion to the apparent inflammation
and probably due to affection of the Pharyngeal Muscles.
Casègne has described the tone throat of Rheumatic Fever in terms similar to that of Sternet's description.

Similar throat appearances are found in other specific febrile diseases such as measles, German measles, Scarlet Fever, Typhoid, etc., and it may regarded as a common phenomenon of such disorders, among which Rheumatic Fever may now, at least provisionally, be classified. It need not be regarded as having any special relation to Rheumatic Fever, and does not carry the importance of the other two forms of Rheumatic Fever.

(B) The Throat as an independent manifestation of the poison of Rheumatic Fever.

Here we have an acute inflammation of the throat, generally an acute tonsillitis, occasionally an acute pharyngitis. It is regarded in the same light as an acutely inflamed joint in Rheumatic Fever. In the former we have the toxin acting locally in the throat; in the latter it has entered the system and producing more extensive symptoms. It is true that in acute Rheumatic affection of the throat the poison may enter the system and produce symptoms other than the characteristic polyarthritic of Rheumatic Fever. It may set up endocarditis, pericarditis, acute pleurisy, perhaps even Chorea, and yet not affect

the
the joints in the least, but such cases of secondary infection are classed in the third group (C) of Rheumatic Sore Throats. While Sennet was probably the first to suggest the existence of this form of Sore Throat, Denno and Bower were the first, in this country at least, to emphasize its rheumatic nature and to advocate its treatment by the drugs so invaluable in Rheumatic Fever, namely, Salicylate of Soda. Here we have to deal with Acute Tonsillitis or an Acute Pharyngitis severe and simple without complications or sequelae due to absorption of the poison into the system. The affection is now believed to be due to certain specific bacteria, as yet unisolated, which are probably always more or less present in the throat or in the respiratory air. Innocent they are so long as the natural resistive powers of the throat tissues, particularly the tonsils and their germ-fighting leucocytes are not below par, but showed this be weakened by some adverse influence, such as chill, fatigue, inhalation of impure air (particularly the inhalation of impure air) then the germs become relatively virulent, invade the yielding tissues, and set up inflammation by means of the irritating toxins which they produce. These germs, as I shall show later very likely...
belong to the pyogenic class, and built very largely of the Staphylococci group. The disease is essentially a septic one. It is notably increased by bad drainage and foul air. Sir Hugh Brown in a paper read before the British Medical Association in 1884, stated that he knew a large institution where drainage was bad. At this time acute tonsillitis formed 21 per cent of the total sick list, and Rheumatic Fever 14 per cent. The drainage was improved, and soon after the throat cases fell to 5 per cent, and the Rheumatic Fever to 7 per cent. In a poor law infirmary which I know, the nurses are divided into two lots, occupying different sleeping quarters. In one place the drainage is bad, and tonsillitis is a prevalent disease amongst the nurses living there. In the other, the drainage is good, and not a single case of tonsillitis or bad throat has occurred amongst the nurses who live there, during the two years that I have known it. The throats of both groups of nurses probably contain Staphylococci enough, but only in those exposed to impure and debilitated air, does the germ get a chance for noxious action.

Hugh in the address mentioned above has noted
apposite atmospheric conditions in which acute rheumatic fever is apt to occur. (1) When the air has been saturated with moisture several days in succession, as is not uncommon in late December or early January, while in the midst of an anticyclone the winds blow gently from the North East and the trees drip with the drops of a fog. (2) When there have been several successive hot and dry days in the course of an anticyclone with northeasterly breeze and with humidity of the air about 80. It is significant that these two atmospheric conditions also favour the occurrence of rheumatic fever.

In the same paper Dr. Brown gives some interesting statistics. He found that out of 119 cases of rheumatic fever, 76 had had rheumatic fever, and 78 had had rheumatism of varying intensity. Of 28 joint pains accompanied the rheumatic fever. The remaining 10 had never themselves had rheumatic arthritis, but one or other of their parents had.

Dr. C. B. Garnett took part in the same discussion (British Medical Association 1887) and submitted some statistics on the subject. He said that out of 769 cases of rheumatic fever and pharyngitis, one third were possibly of rheumatic origin, since in this third fever there was
either a personal or family history of Rheumatic Fever, or there were articular pain present at the time. Of the patients with Rheumatic Fever, one fourth gave a family history of Rheumatic Fever in near relatives, and of those with pharyngitis one third gave similar histories. Among non-Rheumatic patients the proportion with such histories was one fifth. Thus we see that the existence of an acute sore throat due to the same cause as Rheumatic Fever, and indeed in itself an attack of Rheumatic Fever localized in and limited to the throat, is more than probable. The undeniable value of Salicylate of Soda in such forms of sore throat lends no small support to the other evidence. The importance of prompt, thorough, and prolonged treatment of such throat conditions is enormous, when we see the serious consequences that are likely to follow a breach of the tissue barrier, and the introduction of the toxemia of the disease into the system. Salicylate of Soda must be given in large and adequate doses, say $3$ daily or an adult during the acute stage, and conti-
Continued for a fortnight or three weeks afterwards at the rate of a drachm daily.
I have never once seen a bad effect from a large and prolonged dosage with Salicylate of Soda, when it was administered in suitable cases, that is in truly rheumatic subjects. In non-rheumatic cases you do not get the same tolerance.
Locally the treatment must be antiseptic, one of the best applications being glycerine of carbolic acid (diluted with one third glycerine). It ought to be continued for a fortnight after the throat appears well. For another fortnight an astrigent and balsamic application should be kept up, one of the best being glycerine of Tannin Acid. It has to be remembered that a patient once having had an attack of acute tonsillitis or even acute pharyngitis is not only apt to have a recurrence of the same affection, but is also liable to have Rheumatic Fever from life's ruin through a throat weakened through the previous inflammation. You have to treat the throat not only for the present disease, but also with the view of future possibilities with this end in view I need hardly point out the importance of placing the patient in good hygiene surroundings and raising the tone of his health generally.
C) The Throat as the Source of Infection in Rheumatic Fever, Endocarditis, and Allied Conditions

This is the aspect of the subject which recent study and bacteriization have brought forward, and bears on the face of it an importance which the other phases cannot claim. Bacteriological research, the elaboration of our knowledge of germ life, toxin production and the principles of infection, coupled with clinical observation, have gone a long way to prove that Rheumatic Fever must now be included amongst the Infective Diseases and that the point of infection is in all likelihood in the throat. It is true that no germ indubitably specific has yet been isolated, but this final proof is likewise lacking in many of the diseases commonly accepted as Infectious, for example in Measles or Pertussis. Scarlet Fever does not possess one whit more evidence to prove that it is due to a specific bacterium than does Rheumatic Fever. Besides, other Infective Diseases, such as Tuberculosis or Malaria have long been considered Infective, though it is only comparatively recently that their Specific Germs have been demonstrated.

The main facts adduced in support of the Infective Theory are these. The disease is sometimes epidemic.
Epidemics have been reported in London in 1868, 1874, and 1884. Newholm (Milroy Lectures 1895) quotes epidemics in Norway, and shows that these epidemics occur without regular periodicity, recurring at intervals of 3, 4, or 5 years, and varying much in intensity. Strümpell alludes to its periodical increase in Leipzig and Copenhagen refers to its variation in prevalence and intensity there. Church has pointed out that the curves of mortality statistics of Rheumatic Fever approximate very closely to those of pyaemic, miliary fever, and erysipelas, diseases which are constantly associated with microorganisms, just as with which the bacterium of Rheumatic Fever is probably closely allied.

Cases of the disease having apparently been communicated from person to person, have been reported. Dr. Mantle reports two interesting cases of his own in the "British Medical Journal" (June 25, 1872) and quotes others. The of Mantle's cases was that of a girl suffering from Erysipelas Pseudomum. The girl's mother had her first attack of Rheumatic Fever during the daughter's convalescence. In another week the father who was nursing the mother had a first attack of Rheumatic Fever. His other case was that of a lady who, in nursing her husband in his third attack, both the disease for the first time.
(2) The disease is self limited. It is well known that the oblique treatment is valuable as it is in relieving painful symptoms and reducing the risk of serious complications has very little influence in cutting short the duration of the attack.

(3) It mainly affects the young. In my own cases I have found the average age for the first attack to be 23 in males, and 19 among females.

(4) The complications common in Rheumatic Fever are those common in other Infective Diseases, viz. Endocarditis, Pericarditis, Pleurisy, Pneumonia, and Hyperpyrexia.

(5) There is great tendency to Anaemia, Albuminuria and Anaemia.

(6) There is tendency to production of rash, erythema, profuse sweating, and high temperature as in pyaemia. Indeed pyaemia is in all likelihood but Rheumatic Fever in its severest form.

(7) Many Infective Diseases such as Pyaemia, Syphilis, Carlatia, and Cerebro-Spinal meningitis present joint symptoms.

(8) Its origin being explains the number and the variety of the symptoms.
A disease so suggestive of bacterial origin in its general and in its clinical aspects, only awaits definite bacteriological proof, but this so far as not been produced. Still what bacteriological evidence there is has a strong bearing on the throat conditions which is the subject of this essay.

The best work on this subject has probably been done by Hirser of Vienna, who published his results in "Pathologische und Klinik des Akuten Rheumatismus." (1898) He found various bacteria in the blood of patients suffering from Rheumatic Fever, and of these he found the Staphylococcus Pyogenes Albus and the Streptococcus Pyogenes the most abundant. In 2 out of 24 cases did the synovial fluid show Staphylococcus Pyogenes Aureus, but Hirser says that the bacteria may often be found in the periarticular tissues while they are absent from the intraarticular fluid.

He also investigated the urine bacteriologically, examining it in 85 cases of Rheumatic Fever 69 times, and obtained a positive reaction 126 times in 44 patients. He found Staphylococcus Pyogenes Albus 93 times, Staphylococcus Pyogenes Aureus 14 times, Staphylococcus (Pyogenes) Aureus Albus 13 times.
The germs disappeared from the urine during convalescence from the fever. Tisser concludes that Rheumatic Fever is an Infective Disease due to germs of the Pyrogenic Class, and he dwells on its close relationship to Scarlet Fever, Erysipelas, and Peripheral Fever.

Saceau ("Archiv für de Medizin," November 1874) has made a valuable contribution to the subject, and he quotes the researches of St. Germain who obtained joint effusion as the result of intravenous injection of cultures of Staphylococci of ferule virulence in the joint fluid of St. Germain's cases no germs were found, as is so frequently the case in Rheumatic Fever. On the other hand, Charrin and McKenzie are quoted by Saceau as having found large numbers of Staphylococci in acutous effusione from joints of patients suffering with Rheumatic Fever.

Charrin ("Bémaine Med." 1877, p. 105) records a fatal case of pericarditis where the Staphylococcus Pneumonia Aureus was found on the trachea, or vegetations on the pulmonary valve, and in the consolidated patches of broncho-pneumonia that complicated the attack.
Paul Sutton [sic] Jarrod's "Treatise on Rheumatic Fever" 1879 found *Staphylococcus Pyogenes Aureus* in the articular and pericardial fluid of a patient suffering from Rheumatic Fever, but there were also abscesses in the kidneys, which rather invalidates the value of the report.

Chevretzec ("Wien Klin. Wochenschrift" June 20 1895) in a critical review of Jarred's earlier researches points out that a failure to obtain the bacteria in the joint fluid is no proof against the bacterial origin of the disease, since the effusion into the joint is in all likelihood caused by the irritative action of toxins produced by sterno settled elsewhere. In fact the presence of sterno in the joint fluid is to be regarded as an indication of special severity of the attack, approaching the condition of pyogenic.

Chevretzec believes that any microorganism may cause the disease, and may enter the body any where but most frequently by the tonsil or from the intestine. In this relation it is interesting to note two fatal cases of chorea in which pyogenic organisms were found at the Autopsies. The recorded by Bayer ("Jahr für Kinde", Vol 40).
in which a considerable number of pyogenic organisms were found in the blood and various organs including the brain. These cocci were found to be of weak virulence and were probably Staphylo cocci.

The other case is recorded by Dana ("American Journal of Medical Science" Jan 1874). The patient died of exhaustion from prolonged severe chorea. At the post mortem examination meningitis was found, active connective tissue proliferation in the cortex and the presence of diplococci, which were probably Friebel's pneumococci. Now the pneumococci are pyogenic microorganisms.

Other forms in connection with Rheumatic Fever have been described from time to time by Stieff, Petrowe, Klebs and others. Dr. Willem Yodliburgh found bacilli which had their growth arrested by quinine and Salicylate of Soda, but requiring more of the latter drug. Mante has described (British Medical Journal" June 25, 1879) a micrococcus and a bacillus which he found in the synovial fluid of cases of Rheumatic Fever and Rheumatoid Arthritis. Alhalne (Ann de l'Inst Pasteur XI 1897, p. 373) has described a bacillus isolated in 12 cases of Rheumatic Fever, valinol produced symptoms resembling Rheumatic.
Rheumatic Fever.

The reviewing of the bacteriological evidence, I am inclined to favour the view that the gums connected with Rheumatic Fever belong to the Pyogenic class. The bulk of the bacteriological work supports this and it also accords well with the clinical features of the disease. Any of the pyogenic organisms may in all probability be able to set up the disease, but if these the most common is the Staphylococcus Pyogenes Albus.

Bacteriology of Tonsillitis.

I will now turn to the bacteriology of tonsillitis. Dr. St. George Reid made an exhaustive investigation into the bacteriology of Tonsillitis and published his results in the Medical Press and Circular (June 16, 1892). He found that in slight inflammations of the throat as in subacute follicular Tonsillitis, Staphylococcus Pyogenes Albus is the prevalent bacterium found at the seat of the disease. He found this bacterium in 65 out of 757 cases. It forms place in the more acute cases to the Streptococcus Pyogenes Aureus (found in 47 out of 257 cases). An admixture with the Streptococcus Pyogenes Aureus
in either case indicated a greater severity of symptoms. In acute inflammation of the throat without breach of surface, with possibly a tonsillar or peritonsillar abscess, cultures from the surface or from pus drawn from the interior will almost always show streptococcus pyogenes brevis. But if the abscess has burst or the surface ulcerated streptococcus pyogenes auro will take the place of brevis. Reid also examined the blood in these cases but did not find any bacteria present.

Conclusions on Bacteriological Evidence.

We thus see that the bacteria most prevalent in inflammatory affections of the throat are precisely the germs that have been found most extensively in cases of Rheumatic Fever. The staphylococcus pyogenes albus heads the list in both diseases, the other kinds of staphylococci and streptococci coming next. It is a striking fact that this parallelism shouid exist and it goes some way to support the theory that Rheumatic Fever is an Infectious Disease, and that infection takes place through the throat. Probably the majority of cases of Rheumatic Fever.
Sore, the tumors do not leave the throat, but the manufacture the toxins which on absorption produce the symptoms of the disease.

Clinical Evidence.

When we come to consider the subject clinically we are met with the difficulty as to how far a distinction should be drawn between Class (B) and Class (C), between the cases of Acute Scrofulous Tuber and Simple but localized of a Rheumatic nature, and the cases of Acute Scrofulous accompanied by Polyarthritis, or any of the Complications of Rheumatic Fever. Indeed there is probably no hard and fast line to be drawn between them, and it may be a question of the degree of tissue resistance in the throat, and of the degree of susceptibility in the patient. In both cases the tumors are influencing in the throat and producing their toxic there, but in the former there is a tissue barrier sufficiently strong to prevent absorption of the poison to any extent, in the latter this barrier is broken down and toxemia occurs. It is also possible that absorption of the poison may produce symptoms in one person, while it will fail to do so in a less susceptible.
susceptible individual. Again, when a throat has once been damaged by an attack of tonsillitis or pharyngitis, it may readily admit of the absorption of toxin. Should the necessary bacterial infection take place at a later date, as Gerhardt has shown, the existence of the tonsils to the involution of some is largely due to the activity of the leukocytes which they contain, and in the fibroid state of the tonsils so frequently following the inflammatory affection, the number and energy of the leukocytes are considerably impaired. Indeed it would appear from the evidence of my own cases that Rheumatic fever usually follows an attack of the throat after a lapse of some years, whilst Endocarditis is not uncommon during or very soon after the throat attack. Bearing somewhat on this point Davilland Hall in his Pittcomian Lectures (1877) mentions cases of Scarlet Fever coming on after the application of the fulgurant cautery for the treatment of phlebitis phlegmasia. One of these was a medical man who had been constantly in contact with Scarlet Fever patients for a long time before, but it was only after the cauterization of his nose that he developed the disease. He believes that the injury to the mucous membrane of the nose permitted the specific poison of Scarlet Fever to enter the system. Two woodhead has also shown.
shown that the tubercle bacillus does frequently enter the system through the tonsils, when these organs are damaged.

Dr. 10th Stewart of Barreley in a most suggestive and ingenious article in the "British Medical Journal" of November 11th 1852, attributes Rheumatic Fever to the absorption of altered and necrotised leukocytes from the inflamed tonsils. Throughout his essay he has but to substitute the word "toxin" for that of "altered leukocytes", and you have a perfect and vivid description of the modern hypothesis of Eczema.

He sums up his opinions as follows.

(1) Follicular Tonsillitis is by the process of a mild inflammation, which invades the discharge of altered white blood cells through the follicular openings in the tonsils.
(2) Here or there in the tonsils that extended are re-absorbed into the blood by the lymphatic vessels through the glands at the angle of the jaw.
(3) By the induced inflammation the white blood corpuscles are deprived to a certain extent of their normal physiological qualities and to the same extent as they are denatured, they acquire pathological properties in virtue of which they have an intensified tendency to adhere to the inner walls of the capillaries and to one another, and to pass through the capillary walls into the connective tissues and thus form deposits.
(4) They in this way become pathogenetic cells and produce disordered nutrition and perverted functions in these organs in which they are introduced or extracted, and thus establish the phenomena of the disease. (5) The devitalised cells are revitalisable and therefore the diseases which they produce as a rule terminate in recovery.

(6) This theory explains the altered blood condition, observed in these affections, which is established by repeated absorption of cells or by the individual cells communicating to other cells they meet in the blood the same impetus that they themselves have received.

(7) It accounts for the apparent origin of rheumatism from damp and cold, and of chorea from fright by reducting it to them only the power of acting as exciting agents.

(8) It does away with the necessity of a causal connection between any members of the group, and finally it explains in a rational and probable manner the known clinical connection between and the morbid anatomical conditions existing in the various diseases of the group. Thus nearly twenty years ago did Stewart anticipate at least in idea what is becoming the accepted theory of today, and his recognition of tussiella, rheumatic fever, and complications as due to one common cause is worthy of much praise.
Stewart also believed that the sore throat associated with Rheumatic Fever is closely connected with Scarlet fever, if not actually Scarlet in nature. It is well known that Scarlet fever is sometimes followed by Rheumatic fever, or arthritis, signs may come on during the fever, and Klein and others have come to the conclusion that Scarlet fever is in all likelihood due to a variety of the Streptococcus pyogenes. Thus far as bacteriology goes the same found associated with Rheumatic fever are closely allied with those associated with Scarlet fever.

An interesting clinical commentary on this point is made by J. T. F. Raven in a communication in the "British Medical Journal" on March 6, 1878. The domestic servant of a house, which was in a sanitarium condition, happened to be kissed by her lover, who was just convalescent from an attack of mumps, and a few days later she developed Scarlet Fever with arthralgia. Shortly after, she developed Erysipelas of the arm and Subacute Necrosis of hands and knees. Three little boys contracted the disease from her, and three adults, on the house had symptoms of subacute and muscular necrosis, all with swollen throat.

A connection with erysipelas is also suggested. Since this disease is caused by the Streptococcus pyogenes, and erythema is characteristically rheumatic
Dr. Arthur D. Jones makes an interesting communication on this last point in the "British Medical Journal" for June 25, 1879. He records these facts: S.P. age 57, an agricultural labourer was attacked by facial erysipelas early in August, followed shortly by acute rheumatism, from which he had previously suffered eleven years before. S.P. age 47, brother of the above living in a cottage land by same, left his brother up in bed. In August 25 he sickened with erysipelas and in 14 days developed rheumatic fever with pericarditis from which he died on October 1st. Two other brothers of the same family (W.J. & J.P.) have had rheumatism of some kind, and a little while ago two young women daughters of S.P. & J.P. came home almost simultaneously from different situations ill with rheumatic fever; one of these being a second attack. Another daughter of S.P. had it two years ago and a daughter of J.P. had died of the same disease 9 years back. Both in S.P. & J.P. the attack of erysipelas appeared to act as the exciting cause of the attack of rheumatic fever. Both were already predisposed by it.人数: 10月25日、同居の兄弟で、8月25日に顔面赤痢、その後すぐに急性の風湿症を発症。11年前に同様の症状を経験していた。S.P.の兄弟で、同居の農民。2週間後に顔面赤痢の症状が発症し、14日後には心包炎の症状を発症。10月1日に死亡。他の兄弟2人(ウィリアム・ジェイコブス・ジョージ&ジェイコブ)も同様の症状を経験しており、2人の子女も赤痢の影響で風湿症を発症。
When erysipelas is prevalent than at other times (Rydenham Society I 310.) Hebon also thinks that
erysipelas is allied to erysipelas.

Coming back to the throat we find Mantle stating
(British Medical Journal June 26, 1884) that he
believes that in nearly every case bacteria are
introduced into the system through the mucus
membrane of the throat. Chvostek, as noted before,
believes that the microorganisms of rheumatic fever
might enter the body anywhere but probably most
frequently by the intestines or tonsils.

Saez ("Archiv. Inn. de Med."
Riv. 1894) points
out that in many cases of rheumatic fever it is
possible to find or obtain history of some lesion
which may allow the organism to pass into the
circulation. This lesion may be, he says, the injury
of a tonsillitis of marked severity and he brings
forward some cases. This own in support of the
opinion. Greene ("International Clinics" vol 5
1895) has also expressed a similar opinion
at W. C. Green in "British Medical Journal" Sept 28
1885 reports a case of the throat of 3 days duration
followed 3 days later by rheumatic fever.

Dr.
British Medical Journal of Oct 23, 1877 Dr. McDowell
relates a case in which pericarditis came on three
days after the attack of Tonsillitis. There were no joint symptoms and no endocarditis.

Dr. H. Brown at the meeting of the British Medical Association at Leeds in 1874 related two cases of Syphilitic Tonsillitis both with endocarditis and hyperpyrexia. He also states that he had a woman with Mortis Cordis who had her first attack of Tonsillitis during her first lactation and since then has had several alternating attacks of Syphilitic Tonsillitis and Syphilitic Endocardium, without ever having had a rheumatic pain or a rheumatic joint. Brown concludes that Rheumatic Fever is a general disease which as frequently finds expression in the throat as in the fibrous membranes or the inflated tonsil is the receptacle for the rheumatic poison and the medium for its conduction into the general system, or finally that specific germs find their way into the body under circumstances favourable to their entry and then provoke their presence in inflammation of the tonsils and fibrous and fibrous-caseous membranes. Brown is inclined to think that the last view is the correct one.

Dr. A.B. Garrod at the same meeting related a Case of an apical Mucous Membrane coming on in a man suffering from a prolonged attack of pharyngeal pains with the articular pains, but disappearing within a
A fortnight.

Dr. Cheadle in Harveian Lecture ("Sanct" 1879, p. 66) notes case of a boy who developed a Murrain during an attack of tonsillitis. In the "American Journal of Medical Science" for January 1900, Dr. A. Packard relates 5 cases of Endocarditis coming on very soon after an attack of tonsillitis, being acute tonsillitis in three cases, and acute pharyngitis in two cases.

The following are brief notes of cases which occurred within my own observation.

1. Case of Endocarditis, with Transitory Joint Signs, coming on during an attack of Follicular Tonsillitis.

 patient, aged 14, admitted to Infirmary, 23rd August 1889, with fractured femur, and was put in Surgical Ward. Owing to a fall after setting up this stay in the Infirmary was prolonged. He had been suffering from Rheumatic Fever. Chorea or other throat.


January 15. Swart much better. Swelling and pain in
the shoulder joint relaying. Systolic
murmur as before. Temp 100.5° F.

January 18. Swart clean but tonsils slightly enlarged
Systolic Ventral Murmur. No increase in
area of cardiac dulness. Joints normal
Temperature 99° F.

On his discharge a few weeks later he still
had the Mitral Murmur, but had no Cardiac
Symptoms Whatever.

2. Endocarditis Coming on During an Attack
Of Follicular Tonsillitis.
T.T. a boy aged 9 years admitted to the Infirmary
on 9th March 1900 with Follicular Tonsillitis. On
the 11th March he developed he developed an Aortic
Systolic Murmur which still persists. He is very
anemic.

3. Endocarditis and Follicular Tonsillitis.
A. P. aged 13 admitted 27 March 1900. Suffering from
Follicular Tonsillitis of one day's duration.
The heart showed a Soft Mitral Systolic Murmur
Joints normal. Temperature 101.8° F. He had never suffered
from Rheumatic Fever or Chorea, but he had had a sore
throat two years ago. At the present time the acute
A affection of the throat has quite subsided, but leaving slightly enlarged tonsils with ragged surface. The cardiac murmurs persist.

4. Cardiac Disease Associated with or Following the Throat, without Rheumatic Fever.

H.B., nat. 46, a stableman admitted to Infirmary 12th Feby. 1908, with cardiac failure. He had Aortic Stenosis and Mitral Regurgitation. He had never suffered from Chorea or Rheumatic Fever, but had frequently been attacked with gynmies. Cardiac action gradually failed and he died 23 March.

In 5 other cases of Morbus Cordis at present in the Infirmary, in which there is no history of Rheumatic Fever, all have had attacks of sore throat, and in all the present condition of the throat is unhealthy. One of them also had Chorea and Herpes later.

5. Case of Chorea and Cardiac Disease Associated with the Throat.

O.J., nat. 24, female, admitted 27 January 1909, suffering from Mitral Stenosis. She has never had Rheumatic Fever, but her mother has. Last it, she had Chorea off and on between the age of twelve and seventeen, and has had “sore throats” ever since.
was fourteen years old. The tonsils are enlarged with matted purpura.


M. R., female, aged 15, admitted 24 Oct. 1899 suffering from subacute arthritis of right knee. She had a history of *Chorea*, 1½ and 1 year previous. She had Mitral Regurgitation. On 23 December she was rated "well," joint well, temperature normal, and heart acting well though still retaining the Mitral Systolic Murmur. On 28th December she developed follicular tonsillitis. On 7th December the throat is well, but she now displays marked Choreaform movements of the face and arms. On 21st December she had pain in left knee without swelling. She was discharged on 5th January 1900, free from *Chorea* and joint symptoms, but still retaining the Cardiac Murmur, though Cardiac Symptoms were absent.

7. *Chorea associated with sore throat.*

A. J., aged 15, admitted 24 February 1900 suffering from *Chorea*. She had never had Rheumatic Fever, but her mother had had it twice. *Chorea* first came three years ago, after a fright. But she says that she was also suffering from a sore throat at the time. The second attack began about
about a year ago, and still continues. It began a few days after she had been frightened by a fire breaking out in the house. But at the same time she was suffering from a sore throat. On admission her tonsils were enlarged and presented ragged surfaces, and she also had acute rhinitis.

In this case we doubt the fright coming on, when the other circumstances were favorable for the development of the attack, precipitated it, and had she then been free from the throat affection, the fright might have passed without any untoward effect.

8. Chorea Associated with the Throat.

A short time ago in another Infirmary I saw a young woman who had been suffering from Chorea for a month. She gave no history of fright and she had never had Rheumatic Fever though she had occasionally suffered from "Rheumatic pains." There was no family history of Rheumatic Fever. She had frequent suffered from quinsey, and her tonsils were enlarged with ragged surfaces. The heart was normal.
Statistics

The Collective Investigation Committee of the British Medical Association made inquiries with regard to the relationship of Sore Throat to Rheumatic Fever, and published their results in the "British Medical Journal" of December 8, 1883. They found that Tonsillitis preceded Rheumatic Fever, by variable periods, in 25 per cent of the cases of Rheumatic Fever. Out of 655 cases, 157 had previously suffered from Tonsillitis, and 20 others had suffered from Sore Throat of an uncertain nature. Of the 157 patients 27 were subject to Tonsillitis, and 6 of them had Tonsillitis in direct association with Rheumatic Fever. A similar percentage was found by Dr. Mahomed ("British Medical Journal" Jan 16, 1883.)

Dr. Bertran Abrahams (in "Medical Rees and Circular" February 1, 1884) submits a report on an investigation which he made with regard to the relationship of Sore Throat to Rheumatic Fever, Cardiac Disease and Chorea. He found that in cases of Rheumatic Fever in adults 45.5 per cent had a definite history of Sore Throat, and 21.2 per cent had suffered from ulcerated throat within 3 weeks of the attack.
attack of Rheumatic Fever, and 47.2% showed febrile symptoms within 2 days of its onset. Amongst the cardiac cases 66.7% per cent gave a definite history of sore throat, and amongst the chorea cases 53.4 per cent gave a personal or family history of sore throat not associated with any marked predisposition to either arthritis or Motus Cordis.

Amongst the patients of the Infirmary with which I was connected, I have examined the throats and inquired into the throat histories of 62 cases of Rheumatic Fever, 35 being males, and 27 females. In 25 cases (40.32 per cent) there was a definite history of antecedent sore throat. In 17 other cases who gave no history of sore throat, the condition of the throat at the time of the examination was highly suggestive of there having been pre-existing acute sore throat, the tonsils being somewhat enlarged and presenting rough surfaces. The inclusion of these cases would bring the percentage up to 66.77. But taking the former percentage as the more certain one, it will be seen to correspond pretty closely with the weighty Dr. Abraham.
Abrahams. Roughly speaking we may take it that the proportion of cases of rheumatic fever who have had anteceendent sore throat is at least half, and probably more. This is a much larger proportion than that found by the Collectie Inzichten Committee, which I am certain is too small. I took special pains to make certain as to the fact of anteceendent sore throat, which was usually described as a "quinsy" or "ulcerated throat," and I rejected all doubtful cases. In about half of the cases giving a history of a sore throat, the condition of the throat at the time of the examination confirmed the patients history the tonsils being more or less enlarged and presenting the rasped surface so common after prolonged or repeated attacks of follicular (measles, or there was chronic pharyngitis with enlarged pharyngeal tonsils. Age at time of first attack of rheumatic fever varied amongst males from 5 to 53 years, the average being 23. Amongst females the age ranged between 16 and 58, the average age being 29.

The date of the anteceendent throat affecion
in most cases was between 12 and 20 years.
So that several years elapsed between the attack
of sore throat and the attack of Rheumatic
Fever. In only two cases did the attack of
sore throat occur within a few weeks of
the onset of Rheumatic Fever.
Out of the 42 cases of Rheumatic Fever with
history of sore throat or Condition of the
throat rendering previous sore throat very likely,
only 11 did not have any Endocarditis.
Out of 20 cases that did not have any
throat affection, there were only 6 cases of
Endocarditis. It would seem from this
that the liability to Endocarditis in
Rheumatic Fever is considerably increased
by the presence of Antecedent sore
throat.

Amongst my cases of Rheumatic Fever
there was a family history of that disease
in 5 per cent. The family history was
notably marked in one case. The patient's father
and mother, two sisters, and one brother had all
suffered from Rheumatic Fever. The brother and
one sister who were not attacks with Rheumatic
Fever died from Phthisis.
I hope I have in some measure fulfilled the task which at the outset was set before me. The object of this essay was to set forth such facts bearing on the throat factor in rheumatic affections as the author was able to gather from the writings of others and from his own experience, and to emphasize the extreme importance of the throat conditions both from an aetiological and from a therapeutic point of view. I am persuaded that we are just approaching a time when the aetiology of these affections will definitely solved, and when doubts as to a rational therapeutics on antitoxic principles will be clarified. Wherewith to combat the ravages of the malady. And perhaps the significant facts which a study of the throat conditions has brought to light may help us in our small measure to bring about that happy result. And for the present in our everyday practice this knowledge of the widespread and intimate relationship of the throat to the serio maladies of the rheumatic group, raises in importance the most trivial affection of the throat and renders the call for thorough treatment a very imperative one.