

dreds of thousands who wished to know no law but their freshly acquired liberty. His self-prepared code of laws for their government, surpassed, for his time, these of a later period by Justinian and Napoleon, which were the work of jurists. The Rationalist school explained his alleged miracles as an advantage cleverly taken of his superior knowledge of natural phenomena. Voltaire, Tom Payne and Robert Ingersoll, trenchantly attacked him as the gigantic tramp of ancient times. There seems, however, but one conclusion. History discloses few, if any, men of his transcendent grandeur of genius, and despite every discount that the most hostile criticism has yet proposed, Moses remains, and will probably continue to remain, the most wonderful human product of all time.

## ORIGINAL ARTICLES.

### POINTS IN THE ETIOLOGY AND CLINICAL HISTORY OF ERYSIPELAS.

Read in the Section on Practice of Medicine at the Forty-fourth Annual Meeting of the American Medical Association.

BY J. M. ANDERS, M.D.

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In discussing the predisposing causes of erysipelas, authors are greatly at variance as to the influence of age, sex, seasonal effect, etc., among other well recognized factors. It must be confessed, however, that no statistical inquiries have heretofore been instituted to show the exact effect exerted upon the disease by these supposed etiological elements.

In a recent paper on "Seasonal Influence in Erysipelas, with Statistics," the writer has shown, by careful analysis of 2,010 cases collected from different sources, the relationship existing between the various seasons of the year and this affection; and he ventures to hope that he may be pardoned for calling attention briefly to some of the tabulated data contained in his former paper. Table (1) demonstrated clearly that the cases increase month by month in slightly varying ratio, from August to April, which latter month gives the greater number; and that there is a rapid decrease in the percentage of cases from April to August, the latter giving the smallest number. Again: "one-half of all the cases occurred during the months of February, March, April and May, and 15.9 per cent. during the month of April alone. It would appear that the winter and spring months, though more particularly the latter, influence the susceptibility to this disease." To account for this augmentation of cases during the winter and spring seasons no satisfactory explanation has been found. That it is not due to the increase in sickness in general which, as pointed out by M. J. Lewis, occurs in the spring season, may be readily shown. Erysipelas gives the greatest percentage of cases in April, whilst on the other hand, the greatest percentage in the aggregate of human illness, when computed month by month, occurs in March.

Researches were also instituted with a view to showing any relationship that might exist between the mean relative humidity, the mean barometer, and the appearance of cases of erysipelas.

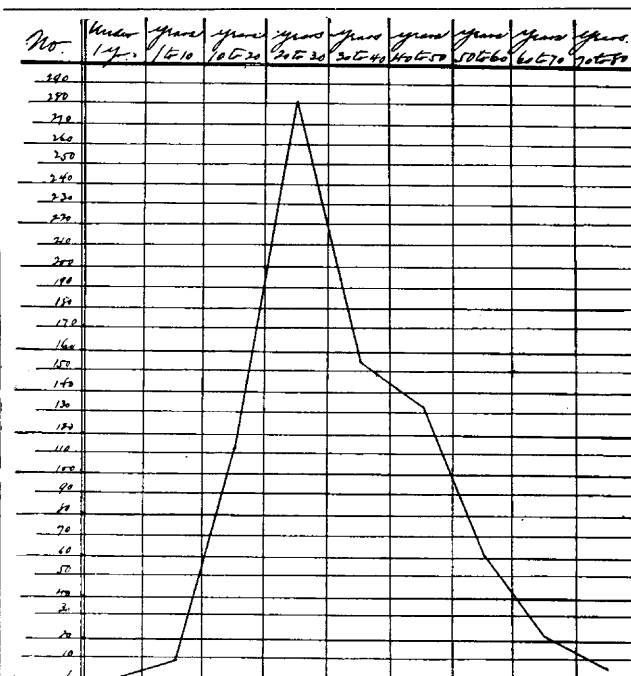
Suffice it to re-state here a few of the deductions which may be found in my former paper relative to

the rôle played by certain leading climate elements in the causation of this affection.

1. That a low barometer and mean relative humidity invariably correspond with the annual period in which the greatest number of cases occur, and the highest percentage of relative humidity with the months affording the fewest cases.

2. Among the meteorological factors, temperature has the least, and relative humidity the most, intimate connection with the disease.

TABLE I.—AGES.



Total for period of each decade.

Representing 781 cases occurring from 1852 to 1892, inclusive.

Erysipelas is not to the same extent as chorea and rheumatism related to the seasonal variations in the totality of human illness.<sup>1</sup>

That the foregoing conclusions are based upon adequate data will be seen by a glance at the accompanying table. It however will also be observed that, for the months of September, October, November and December, the tracings do not maintain the same resemblance to one another as during the months from January to September, hence the effects of the various meteorological factors alone are inadequate to account for the steady rise, in the percentage of cases, throughout the cold months and more especially the quite considerable April augmentation. The interesting fact, however, remains proven, even though not explicable, that the disease is to a considerable extent dependent upon seasonal influence.

#### PREDISPOSING INFLUENCE OF AGE.

The period of life at which persons are most liable to erysipelas has not, up to the present, been definitely determined, though there appears to be a pretty general impression among medical writers that it is most commonly met with in the young. Dr. J. A.

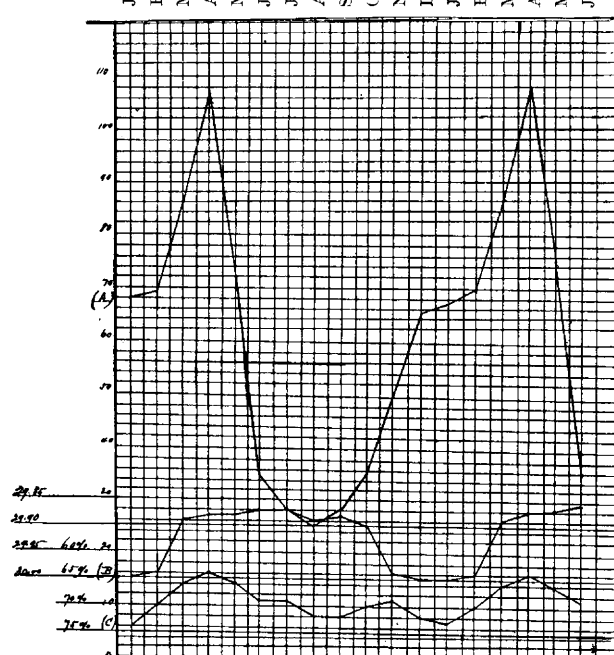
<sup>1</sup> For a more complete discussion of the points raised, the reader is referred to the original article—Proceedings of the American Climatological Association, for 1893.

Glaser (*Therapeutic Monatshefte*) reports 148 cases of erysipelas, in part from his private practice and in part from cases observed in the hospital. "These did not include any but his severe cases, and were scattered through fifteen or sixteen years. The patients varied in age from three-fourths of a year to seventy-five years. The largest part of them were between twenty and forty years old."

With a view to ascertaining with some approach to exactness the influence of age as a predisposing factor, I have obtained notes in 1,894 cases. Of these, 1,754 were acquired from the records of the various hospitals of Philadelphia and 143 from my private practice and the practice of others, who kindly furnished me with reports of their cases.<sup>2</sup>

In a small proportion of the cases only, the age of the patient was not given. The records of Blockley Hospital, Philadelphia, furnished 1,113 cases. It should be pointed out, relative to the latter statistics, that I can do nothing more at present than to give the average age of the patients. During the years from 1857 to 1870 inclusive, there were 234 cases whose average age was 45 years. In 879 cases which were admitted into Blockley Hospital during the years from 1870 to 1890 inclusive, the average age was 43 years. On the other hand, the average age of the cases derived from all other sources (781 in number) was 29 years. The average age of the 143 cases reported from private practice was 29.5 years. The explanation of this apparent great discrepancy in the ages is to be found in the fact that the average age of all patients admitted into Blockley Hospital is much greater than the average age of those admitted into other institutions or those met with in private practice. The patients cared for in the wards of Blockley Hospital come from the pauper element of the population in Philadelphia and elsewhere—an element composed in great part of middle-aged and old persons.

TABLE II. Jan. Feb. Mch. Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mch. Apr. May June



[Explanation of Table.—A—1163 cases occurring from 1871 to 1890, inclusive. B—Mean barometer from 1871 to 1890, inclusive. C—Mean relative humidity from 1871 to 1890, inclusive. The cases increase in increments of 10. Barometric pressure reckoned in inches. Mean relative humidity given in percentages.]

With this brief reference to the statistics obtained from Blockley I dismiss them, but desire to call attention to some interesting as well as practical points growing out of a further analysis of the 781 cases previously mentioned. In order to indicate the proportionate percentage of cases for the different periods of life the subjoined table has been carefully prepared.

Since this chart is quite simple and really self-explanatory, it will be unnecessary for me to do more than to call attention to a few facts, which are of sufficient importance to be emphasized. The tracing in the table represents the whole series of cases and increases in increments of ten. It will be observed that more than one-half of all cases occur before thirty years of age; that the period of greatest liability is from twenty to thirty years; that from thirty to fifty years the cases slowly decrease, and after fifty years quite rapidly. It should be noted especially that under ten years the disease is extremely, and between ten and twenty comparatively rare. The period of greatest frequency—from twenty to thirty years—furnishes 35.8 per cent. of the aggregate number of cases.

No attempt has been made to separate the idiopathic from the traumatic form of the complaint, and chiefly for the reason that in most instances the distinction was not noted in the records.

*The Effect of Sex.* The influence exerted by the sexes was also shown by the results of these investigations. The sex was noted in 1,767 cases. Of these, 1,219 were males and 548 females. It remains to be stated, however, in reference to the hospital statistics, that, in proportion to the whole number of cases of all complaints among the males as compared with those among the females, admitted into the institutions named, the preponderance of the former over the latter would not be so great as indicated by these figures. And yet, after making due allowance for all modifying conditions, the ratio would be as three to two in favor of the male sex. The same thing may be shown by considering separately the 143 cases gleaned from private practice, of which eighty-five were males and fifty-eight females. Of the 148 cases of erysipelas reported by Dr. J. A. Glaser (*loc. cit.*), fifty-one were women and ninety-seven men. That the disease is more frequent in the male than the female sex is thus definitely shown. This dictum may excite surprise in view of the fact that by most authors erysipelas is stated to be more common in women than in men.

The fact is rapidly becoming recognized by the profession that slight abrasions and fissures, either in the mucous membrane of the nose or in the skin of the face or the ear, as well as all forms of slight injuries, are liable to furnish a path of ingress to the specific poison. This point has also been corroborated by the results of our researches. In 643 cases which were examined with reference to this question, slight injuries and abrasions were noted in 113. Doubtless in many of these instances the examiner omitted to search for such lesions as we are considering. In most of the instances (here enumerated) the character of the changes was particularized as follows: slight contusion of forehead,

<sup>2</sup> I desire to express anew my grateful acknowledgment of the services kindly rendered, in the collection of these cases, by Drs. G. H. Crabtree, Wm. Osler, George Booth Miller, L. S. Bromley, Weiser and Litchfield and by numerous professional friends for cases from their private practice.

in six cases; small wounds of forehead, six cases; slight scalp wounds, seven; trifling lesions of the ear, four; slight wounds of skin of nose, six; syphilitic erosions of nasal bones, four; wounds of eyebrow, three; wounds of eyelid, three; slight injuries to leg, three; slight wounds of cheek, wounds of thumb, two each; vaccination, excoriation of elbow, toe rubbed by boot, corn cut, caries of tooth, small sty, excoriation of foot, dog bite, one each.

It is interesting to note that, out of a total of 301 histories examined for me, by Dr. M. Booth Miller, acute coryza preceded the attack in thirteen instances. Doubtless in these, slight lesions of the Schneiderian mucous membrane favored specific infection.

Testimony confirmatory of the well known fact that certain chronic diseases, such as chronic Bright's, phthisis etc., increase the susceptibility to the complaint, was also brought to light by these inquiries.

The chronic affections in the course of which erysipelas occurs most frequently are shown by the following analysis of 1,665 cases, viz: in the course of chronic leg ulcers, sixty-seven occurred; in chronic pulmonary tuberculosis and chronic nephritis, fifteen each; in rheumatism, fourteen; in organic heart disease, ten; in urethral stricture, six; in syphilis and synovitis, five each; in asthma, chronic pleurisy and chronic alcoholism, four each; in bone necrosis, malaria, locomotor ataxia, senile debility and puerperal state, three each; in typhoid fever and sciatica, two each. Instances in which single cases occurred secondary to other chronic affections were numerous, but need not be detailed here. According to these figures the proportion of examples in which erysipelas is secondary to chronic diseases is not formidable, the percentage being 7.8, if we include those diseases that furnish but a single case of erysipelas.

Individual predisposition to the complaint was shown in some instances, though not as frequently as some writers would have us believe. Of 450 instances previous attacks were noted in thirty-nine, or in 8.06 per cent. One patient had had seven previous attacks; another, four; several, one, two and three attacks respectively. Family predisposition was noted in four instances. One of these patients stated that he had had many previous attacks and that his father and two brothers were also very susceptible.

#### POINTS IN THE CLINICAL HISTORY.

As to the chief seat of the local manifestations exact figures cannot be given since, in numerous instances, no mention of the locality was made; and yet the data obtained on this head were full of interest. The notes of the cases examined gave the result here stated. The locality was ascertained in 712 cases; of which 517 or 72.6 per cent. were facial; 127 or 17.8 per cent. affected the leg and foot; seventeen cases or 2.3 per cent., the arm; eight cases or 1.1 per cent. the hand; while five cases or .7 per cent. implicated the scrotum. The cases in which the inflammation occupied portions of the body other than the head could not all be classified as idiopathic. For instance, as before stated, sixty-seven cases were secondary to leg ulcers. Here the ulcers served as a gate of entrance for the specific virus. After a careful elimination of cases in which there seemed to be any doubt, we have 586 as the aggregate number belong-

ing to the idiopathic variety. Of these, 517 or 88.2 per cent. were facial; 50 or 8.5 per cent. occurred on the leg and foot; ten or 1.7 per cent. on the arm; five or .85 per cent. on the hand; and four or .68 per cent. on the scrotum.

It is seen that nearly all cases of idiopathic erysipelas attack the face—a fact previously well known. The next most favorite seat of this disease is the leg—a fact not heretofore demonstrated.

*Course and Duration.*—Both the clinical course and duration of erysipelas were found to be quite variable; and this was owing largely to the presence of complications (which are numerous), the previous condition of the patient, age, etc. I regret that the limits of the present article will not permit me to discuss the various complications that were noted as occurring in this complaint. The average duration of the affection was computed in 1,880 cases and found to be (including relapses) 25.13 days. At any period of life, according to these observations, the stay in a hospital, or the duration of a case in private practice, was lengthened almost indefinitely when the patient had been previously in an enfeebled condition on account of chronic disease, and when complications existed. The average course was found to be much less in uncomplicated cases occurring in persons under 40 years, which is the time of life corresponding with a preponderating proportion of cases, viz., about fourteen days.

These results point strongly to the important practical facts: that erysipelas in a typical form is a self-limited disease; that the length of the attack is greatly influenced by the age of the patient *per se*, its average duration in persons of 50 years or over being considerably longer than in younger subjects. Sex has no influence in this direction.

That relapses are rather common in this disease is a fact long since learned by the profession. Among 476 cases recorded, relapses occurred in 54, or 11.3 per cent. It is interesting to note that in one patient five relapses occurred; in two others, four; and in three patients, three. First and second relapses were still more common. Single relapses were frequently observed, in typical cases, in otherwise healthy subjects. On the other hand, multiple relapses occurred most frequently in persons whose general health had been previously impaired.

DR. HOBART A. HARE, Philadelphia—There is always danger in averages on cases; you can not get a correct idea of the average age at which a disease is apt to attack a person by looking over a column of figures, and if you make a mathematical average you may get an average which is misleading. A few years ago I looked over some statistics and found the average age was something like forty years, but by a careful examination of tables I found that the disease affected persons early in life and very late in life; forty years was not the most common, although the average age; seventy and ten added together gave me an average of forty, which was misleading. I appreciate the fact that Dr. Anders has eliminated as far as possible the dangers which are always present in making the averages in statistics.

My experience in St. Agnes and Jefferson Hospitals has convinced me of the truth of the statement made by Dr. Anders in regard to the frequency with which the erysipelas we are apt to call typical, depends upon lesions of the nasal or conjunctival membrane. I remember a few years ago in St. Agnes Hospital in convalescent cases of typhoid who had erysipelas, there were always marked complications of the

face and nose. The stuffing up of the nasal cavities with dried secretions had been present to a great extent. In the mucous membrane of the nose we have the means of entrance of the microorganisms, the bacilli which first come with the destruction of the mucous membrane, with the pus. Unlike many diseases which are dependent upon the streptococcus, introducing itself in low vitality which decreases normal resistance and gives opportunity for the streptococci to produce the characteristic lesion.

I have also been much interested in what Dr. Anders said in regard to the frequency with which the disease attacks males instead of females. Most tables will show that acute inflammatory disease does not affect the male more than the female. The reason is the male is so much more exposed to traumatism, injuries which will allow the entrance of the streptococcus, than the female, but if women had the same opportunities for receiving injuries we might find them suffering from the disease even more frequently than men.

DR. J. M. ANDERS, Philadelphia, in closing the discussion, said: One of the points he raised should be answered. He stated that in adding together all the cases year by year and dividing by the total number of cases and in that way obtaining the average age of persons affected would in a great many cases give a misleading result, especially where the disease was most frequent at either extreme of life. If Dr. Hare had followed me closely he would have known that I added the cases together and got the total number, and I also gave the period of greatest frequency and the time of life at which cases were the most numerous, in that way overcoming his objection to the manner of investigating the subject. All the other points were well taken.

## THE DETERMINATION AND SIGNIFICANCE OF CARBOHYDRATES IN THE URINE.

Read before the Section on Practice of Medicine at the Forty-fourth Annual Meeting of the American Medical Association.

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CHICAGO.

Carbohydrates are so called because they are compounds of carbon, hydrogen, and oxygen; the last two elements being present in the proportion in which they occur in water. The carbohydrates met with in the urine are chiefly glucose, levulose, lactose and inosite. They resemble one another in their chemical composition, in all containing six atoms of carbon or a multiple thereof. They also resemble one another in their chemical characteristics; being neutral in reaction, not prone to enter into combinations, and with the exception of inosite, they all possess a strong rotary power over polarized light.

The chief clinical interest with regard to the presence of carbohydrates in the urine at present belongs to grape sugar; some knowledge of the other carbohydrates met with in the urine is necessary for differential purposes in testing; as well in a few cases for their clinical significance, but since the latter are for the most part of comparatively minor importance, the greater part of this paper will be devoted to the consideration of glycosuria.

### GLYCOSURIA.

Grape sugar in its pure form crystallizes in rhombic tablets; is soluble in its own weight of water, and gives a dextro-rotary power over polarized lights of + 57.60. Its solutions become brown when boiled with liquor potassæ, but with picric acid a deep mahogany red. In the presence of strongly

alkaline solutions, it reduces cupric salts, precipitating red oxide of copper; it also reduces bismuth salts with resulting black precipitate. Faintly alkaline solutions of grape sugar colored blue by indigo, when boiled, exhibit a beautiful color, reaction beginning with violet and ending with yellow. Lastly, with sodium acetate solution it reduces phenyl-hydrazin hydrochlorate to phenyl-glucosazone, forming highly characteristic and beautiful golden yellow ascicular crystals.

Grape sugar exists in minute quantity in normal blood, varying chiefly with the functional activity of the liver. In some abnormal states of the system, the amount of sugar in the blood becomes markedly increased, reaching its maximum, about one-tenth of one per cent., in the more pronounced diabetic conditions.

It has long been a disputed question if sugar be present in normal urine as first affirmed by Brucke. The investigations of Seegen for some time seemed to negative such assumption; but quite recently this question has received emphatic confirmation through the researches of Wedenski. Taking advantage of Baumann's discovery, that benzoyl chloride forms insoluble compounds with carbohydrates, Wedenski succeeded in separating from the precipitate thus formed in normal urine a body which gave all the reactions of grape sugar; so that these investigations must be considered conclusive. Although therefore sugar exists in normal urine as above shown, the quantity is so exceedingly minute that it is unrecognizable by our ordinary methods of testing, and consequently its significance is physiological rather than clinical, and need not further detain us.

### CLINICAL SIGNIFICANCE.

Glycosuria may appear as a temporary condition in the course of a number of diseases, as cholera, intermittent fever, scarlatina, gout, cerebro-spinal meningitis, diseases of the lungs, liver and brain; especially if involving the fourth ventricle. It must be admitted, however, that glycosuria is comparatively rare in such cases, and when present the quantity of sugar in the urine is small.

Sugar appears in the urine after the administration of phloridzin, and until recently we have been taught that temporary glycosuria may be induced by the administration of certain drugs, as strychnia, curare, chloroform, ether, and carbon monoxide. Our improved methods of testing, however, have conclusively shown that the substance in the urine in these cases which reduces the copper test is glycuronic acid and not sugar.

Temporary glycosuria may be induced by cutting or puncturing various parts of the nervous system, by wounds of the liver by means of needles; by injecting acids or stimulants into the hepatic veins, and by violent irritation of some sensory nerve. It is more than probable that in all such cases the glycosuria is brought about by interference with the center for the vasomotor nerves of the liver. Inasmuch as in all these cases the glycosuria is slight, and of only temporary duration, the interest attached to temporary glycosuria of this order falls more within the province of the experimental physiologist than that of the clinician.

Comparatively recent observations have shown that complete extirpation of the pancreas in dogs