

practice can be directly traced to his teaching. Such is the case with the practical application of the basic process for eliminating phosphorus in the Bessemer converter—a process of truly national importance, and one which has been widely adopted in other countries. It may fairly be claimed that during the thirty years he held his chair he trained a body of scientific workers in whose hands the immediate future of metallurgy to a great extent rests.

Remarkable evidence as to the strength of his individuality is afforded by the fact that those who were admitted to his friendship, and even his students who only saw him in the lecture room or laboratory, were all singularly attracted to him, notwithstanding the occasional ruggedness of his manner. The purity of his style and the quaintness of his illustration recall the writings of another doctor, Sir Thomas Browne, making, of course, due allowance for the difference of the periods at which they wrote. The subjects he dealt with were very diverse, and it would be interesting to collect his trenchant letters, which appeared in the *Times*, usually over the signature Y. One especially occurs to the writer. Dr. Percy was charged with the superintendence of the ventilation of the Houses of Parliament, and amusingly describes his difficulties in meeting the varied and often contradictory requirements of the members, as to the temperature best suited to their work. He was an honorary member of the Institution of Civil Engineers, and held the office of President of the Iron and Steel Institute in 1885, having received the Bessemer medal of that Institute in 1877. His artistic skill was considerable, and he possessed a fine collection of water color drawings.

Two days before his death the Prince of Wales awarded him, on the nomination of the Council, the Albert medal of the Society of Arts. Dr. Percy was still able to appreciate the honor which had been done him, and received the intimation with the characteristic words, almost his last, "My work is done."

W. C. ROBERTS-AUSTEN.

"HAY FEVER"—PERIODIC CATARRH.\*

By Dr. G. ARCHIE STOCKWELL, F.Z.S. (Member of New Sydenham Society, London), Detroit, Mich.

"CIVILIZATION by its advancement constantly entails new ills to mankind," is an assertion of many philosophers, ancient and modern. Democritus long before our era formulated it as an axiom, and that it is not without a measure of truth is evidenced by the accessions to our medical nosology and nomenclature.

It is only within three-fourths of a century that the distressing malady popularly and erroneously denominated "hay fever" or "hay asthma" has been recognized as a malady *sui generis*, or that it has attained sufficient prominence to secure a place in medical literature. That it is distressing, every one must admit who has been brought in contact with its victims, or who has suffered from its paroxysms. Then, too, it is almost despicable, since, in spite of the suffering it entails, it possesses none of the elements that can be considered as dangerous or threatening to life, which might in some degree console its victims by exciting the sympathy of the exempt; but instead it is self-limited, both in course and recurrence, even though, chameleon-like, its manifestations are seldom exactly twice alike in the same individual, and seldom attended with the same precise phenomena in each season. Its phases are as multiple as its victims, and as numerous and varied as the meteorological caprices of its environment.

Absurd and paradoxical as it may appear, the malady stands in *locum tenens* of a luxury, and, like all other luxuries, its obtention is accompanied by no little personal sacrifice and cost, for it is dearly paid for by all unfortunate enough to come within its pale. Then its recurrence tends to inculcate habit, since it fastens more firmly, and becomes more and more exacting, with each season. The evidence of this rests in the fact that if the attacks are anticipated for several seasons in succession by removal to those regions without its pale, the force of the annual habit is lessened, and while the tendency may not be altogether obliterated, the acuteness of the paroxysms is notably mitigated for a considerable period.

Again, no age is exempt. [Moulton observed in a child eight years old,† and Wyman in one three years younger.‡] It prefers the temperate to the torrid zone, altogether ignores the Far North, where the intense heat of the brief summer would seem to invite its appearance and residence; dreads the highlands, with their rarefied air; and hates the vicinity of large bodies of water with all the intensity "Auld Clootie" is supposed to manifest toward the churchfont. It chooses the city in preference to the country and forests; seeks out the man rather than his helpmate, though the fair sex are not wholly exempt from its terrors; and in whatever part of the world it appears, the victims are almost exclusively selected from among the Anglo-Saxon, or at least the English-speaking race. Moreover, it is aristocratic as well as autocratic in tendencies, since it exempts the poor, ignorant, rude, and lowly, to prey upon the wealthy, the gentle, the sedentary, and the intellectual; it is the bane and curse of the courtier and the mock and jest of the clown.

The origin and history of periodic catarrh are alike shrouded in uncertainty and obscurity. In the early part of the present century [1819] Dr. John Bostock, himself a sufferer, described the disease under the name of *catarrhus aestivus* or "summer fever" in the *Medico-chirurgical Transactions* § of Great Britain. Nine years later, a second communication from his pen appeared in the same periodical, that, if it did not offer new facts, at least evinced the accessions that had occurred to the malady as manifested in himself. In this second essay|| he incidentally mentions it as a "hay" fever, a pseudonym that was immediately adopted, under the supposition that pollen of grasses were the immediate etiological factors. The title thus unintentionally bestowed was perpetuated in good faith by Mr. Charles Blackley of Manchester, who (in 1873) con-

tributed an extensive monograph upon the subject,\* and boldly asserted that the disease depended for its source upon the ripening of the *graminaceae*, since he could "conceive of no other cause." In this he followed not only the teachings of Bostock, but of Gordon [1829], Elliotson [1839], Abbott Smith, Pirrie, and Moore [1859]; and if I mistake not the same obtained in the teachings of Morrel Wyman [now a recognized authority on the subject] in Harvard in 1854, and perhaps later, though he early discovered good grounds for abandoning the theory. Elliotson opined the offending growth was *Anthoxanthum odoratum*, basing his views upon the fact it flowered in Great Britain at about the time "hay" fever is wont to manifest itself; others ascribed it to *Anthemis maculata*, and elaborate arguments were offered from time to time to sustain these positions. The fallacy in both instances was proved in the United States, where these plants are alike common, flowering in May or June, while the disease, save in some few instances, does not manifest itself until the middle or latter part of August. It will be observed that "hay" fever in England recurs in mid-summer or in June or July, and is the analogue of what on this side of the Atlantic is termed "June" or "rose" cold; and while the flowering of *Anthoxanthum* and *Anthemis* corresponds to the period of the malady abroad, in the New World there is a discrepancy of from nine to thirteen weeks between the production of pollen and the onslaught of periodic catarrh. Again, farmers, farm laborers, florists, gardeners, hostlers, and stable boys, people whose callings especially tempt the malady, were grasses at fault, are rarely or almost never its victims. In an experience of nearly a quarter of a century, I cannot recall a single instance in practice or in periodical medical literature. Still, the general impression, not only among the laity, but a majority of the medical profession in Great Britain, appears to be that the malady as found there is intimately connected with the harvesting of grasses, and that if the latter are not producing causes, they at least intensify the paroxysms, as may be judged from the fact that so eminent a man as Dr. E. De Havilland, F.R.C.P., of Westminster Hospital, writes to the *British Medical Journal* [June 15, 1889]: "The return of the hay season and the prospect of their being an unusually abundant crop this year has induced me to direct attention to hay fever, which is a subject of ever increasing interest." Again, Doctor Bertram C. Windle, Professor of Anatomy at Queen's College, Birmingham, remarks [Birmingham Medical Review, December 1888]: "As to the cause of the disease, I have no doubt in my own mind that pollen of some kind or another—almost certainly that of some grass or grasses—is to blame." In this country, however, "rose" cold, "June" fever and cold, etc., are titles suggested by the idiosyncrasies of individuals who may suffer a real coryza or asthma as the result of habit or from a hypersensitiveness of the respiratory apparatus that induces this condition when brought in contact with the leaves, flowers, pollen, etc., of certain trees, shrubs, or plants; the down of rose petals or leaves, or "fuzz" from the skin of the peach or rind of muskmelon is often at fault, and in some localities the pseudonym of "peach" cold obtains. Those who suffer from "June cold" often escape the autumnal coryza which is the most common form, while others suffer from both, with a brief period of relief intervening.

Rag weed [*Ambrosia artemisiifolia*] is generally accused of producing periodic catarrh or coryza, and while the supposition has no basis in physiology or fact, observation and experiments that have been made with a view of determining the exact relation of this growth evidence its complicity oftentimes, not as an original or producing factor, but in intensifying and accelerating the course and paroxysms of the malady. The evidence is such that in the light of the public weal, municipalities should at least take measures to repress the blossoming of rag weed within their boundaries and to prevent its growth.

Among other theories that are worthy of mention is that of Helmholtz† [advanced in 1869], who suggests the presence of vibrios in the nasal cavities, that remain dormant during the winter and spring months, but are gradually warmed into activity by the heat of summer. Strange to say, at this time, when the microbe theory is rampant and held the derivative of all maladies from warts to ague and salt rheum to cerebrospinal meningitis and diphtheria, no one has as yet availed himself of the broad field for research afforded by periodic catarrh, which is still "going a-begging" for a coccus. The hint herewith thrown out is offered gratuitously to some enterprising pathologist.

Thus far I have employed the name *periodic catarrh* as indicative of the malady known as fever, asthma, catarrh, coryza, cold, etc., with all the adjective denominations of "hay," "summer," "ragweed," "pigweed," "peach," "August," "pollen," "idiosyncratic," et al., but the title is inappropriate and inexact, for, as already shown, the same precise symptoms and paroxysms manifest themselves at different seasons, in different localities and in different individuals, and moreover is not in all instances strictly periodic.

The proposed compromise of Dr. Phoebus,‡ who suggested the title of *fruhsummer katarrh*, "summer catarrh," is also open to objections, since, contrary to general and preconceived opinions, the malady may, and sometimes does, manifest itself in midwinter. One of the most interesting cases from a medical standpoint that has ever come to the knowledge of the writer was found in the person of an English gentleman who, though not a medical man, is well known to science [Richard Proctor]. The asthma, for it partook of this form, occurred only during the cold months, and was always aggravated by a rime or hoar frost, especially if the latter was followed by a bright, sunny day. To employ the gentleman's own words narrating the history of his malady, for many years prior to the first attack he suffered from a cough; used to catch periodical colds, and with true cold came along acute asthma, when he was very much distressed: since the asthma became chronic [attended by constant paroxysmal sneezing, coughing, phlegm, and eyes inflamed and watering], he has scarce ever had a real cold.

All that is denominated autumnal catarrh, "hay"

fever, or "hay" asthma, however, is not properly of the class to which they are popularly assigned or to which these terms are intended to apply. Many are in reality pseudo cases, dependent upon abnormal growths and hypertrophy or thickening of the mucous lining of the throat and nasal cavities, conditions easily removed, and that, once remedied, prevent further accessions of paroxysms. It is not known that polypoid growths tend notably to the production of asthma and other conditions that precisely resemble those induced by periodic catarrh. Indeed, many of the more common asthmatic and bronchial affections arise from conditions no way pertinent, in fact grossly irrelevant, to "hay" fever, so called. Within a year, in the experience of the writer three cases supposed to be "hay" asthma were permanently relieved by the removal in each instance of numerous small polypi attached to the posterior border of the nasal septum. It is not necessary, however, to here dwell upon this part of the subject, since at best it is but a side issue, and will be referred to again further on in considering methods of relief. All these facts, however, including the recurrence of asthma and coryza at different periods in certain individual cases, lead the way to the conclusion that the true "hay" fever so called is simply an idiosyncratic, paroxysmal malady, of nervous origin, and induced through the series of nerves [vaso-motor] distributed over the coats of blood vessels. Hence J. N. Mackenzie\* suggests as an appropriate title *vaso-motor coryza*. But, although this theory is generally accepted by modern physiologists and pathologists, the entire truth has not been told, since it is almost of too great dimensions to be grasped in its totality by ordinary comprehension, and the medical profession, to a certain extent, are in the position of the three blind men in the fable of Tolstoi, who, having mastered a fraction, imagined they had grasped the whole.

Sir Andrew Clarke undoubtedly struck a key note when in the Cavendish lecture [*British Medical Journal*, June 11, 1887] he emphasized the doctrine that the evolution of vaso-motor coryza embodies three great factors:

*First*.—A nervous constitution or idiosyncrasy, sometimes inherited, sometimes acquired.

*Second*.—A local condition of irritability, involving the nervous, vascular, and cellular constituents of the affected parts, and which, when excited, disturbs the chemical, morphological, and secretory changes taking place therein.

*Third*.—External exciting or determining causes, i. e., the agents which are capable of calling into action the irritability of the parts concerned.

The first of these is so vague, and so little susceptible of any direct treatment, that to discuss it in a paper of the character of this is impracticable. In considering the second factor, viz., the condition of irritability of the mucous membrane, it must be remarked that in spite of the advances made in the study of this affliction, no matter whether it asserts itself as a vaso-motor coryza or as an asthma, the interior of the nose receives too little attention; the treatment had been objective rather than subjective. This much, however, is recognized:

When local irritability is provoked into action, then arise series of local structural changes which are characteristic of the onslaught of the malady. The erectile tissues of the nasal passages and posterior throat become distended, the blood vessels are gorged, groups of lymph cells fill the lymphatic spaces, the mucous surface is crowded with migrating leucocytes [white blood corpuscles]; younger epithelial cells are vacuolating and proliferating, secretion is increased in quantity and altered in character and composition, sensation is heightened, intensified, altered, or benumbed, and the whole metabolism of the affected region is profoundly disordered.

As regards the third factor, there is, of course, as already remarked, an overwhelming weight of evidence in support of the view that pollen and other plant or fruit products are the most potent of external exciting cause. It is contended that the disease may be prevented from developing, or be cured when present, by dwelling on board ship at sea, where no pollen is to be found. That it obtains both as "June cold" and "autumnal coryza" only during the season when certain flowers or grasses are in blossom, and that it may be artificially induced in the immune and exempt by the application of the blossoming products to the nasal mucous membrane. Mr. William Murrell,† of Westminster Hospital, London, cites as the most guilty plants not only the *Anthoxanthum odoratum* ["sweet-scented vernal grass"], but *Bellis perennis* [the common "daisy" of England], *Lolium perenne* ["rye grass"], and *Holcus odoratus* ["sweet-scented soft grass"], while in India, where the malady occurs chiefly in February, it is the blossoms of the mango tree [*Mangifera Indica*] that are held responsible. Again, in the United States I have known Indian corn [*Zea mays*], flax [*Linum usitatissimum*] and millet [*Panicum miliaceum*], as well as "pig weed" or "goose foot" [*Chenopodium album*], "hog" or "rag" weed [*Ambrosia artemisiifolia*], and "smart weed" [*Polygonum hydropiper*], and the *Rosaceae*, each and all to be accused. Miss G—B—, of Boston, informs me that during portions of June and July, and also of August and September, she is unable to approach a rose tree, to remain in a room where the flowers are, or anywhere in their immediate vicinity, without the most distressing paroxysms being induced, though after the advent of frost, and until the next succeeding June, their odors may be inhaled with impunity. Mrs. J. W. S—, a former patient, is equally susceptible, and Trosseau was in like manner affected by violets.

Now, while it must be admitted that these contentions are in some degree just, and that plants are common sources of aggravation [and perhaps in some instances the immediate cause of the disease], it cannot be denied that they lack qualifications, and that they are inadequate to a complete explanation of all the facts which go to make up the history of the coryza and asthma. In looking closely into the matter we find the supposed provocations as numerous almost as the individual sufferers; also, that persons free from the malady obtain attacks simulating "hay" fever from certain idiosyncrasies. For instance: Cullen ‡ re-

\* Read before the Western Hay Fever Association at Petoskey, Michigan, Aug. 27, 1889.

† "Cavendish Lecture," *Br. Med. Jour.*, June 11, 1887.

‡ "Autumnal Catarrh," by M. Wyman, Boston, 1876.

§ Vol. x., p. 161.

|| Vol. xiv., p. 437.

\* "The Causation of Hay Fever."

† Virchow's *Archiv*, vol. xlv., part 1 (Feb., 1869), p. 101.

‡ "Der Typische Fruhsommer Katarrh oder das sogenannte Heufieber, Heuasthma." Giessen, 1862.

\* *American Journal of the Medical Sciences*, July, 1883, and *New York Medical Record*, July 19, 1884.

† *British Medical Journal*, June 16, 1888.

‡ "Practice of Medicine," London.

fers to a case in which the most intense agony was induced by the vicinity of a rice-thrashing floor, regardless of the period of year at which the grain was separated from the husk. Sir Thomas Watson says: \* "I recollect a servant employed in the laboratory of St. Bartholomew's Hospital who had the peculiar ill luck to be liable to this affection when in the presence of ipecac, and whenever this drug was in preparation he was obliged to fly the place, and this idiosyncrasy is by no means uncommon." William Smith† records instances of "hay" fever provoked by linseed meal and by mustard; William Murrell‡ by powdered colocynth ["May apple"], the effluvia of a clean pocket handkerchief fresh from the ironing table, locust tree blossoms, mulberry blossoms and fruit, etc.; Sidney Ringer§ by the exhalations of monkeys, dogs, cats, horses, rabbits, Guinea pigs, cattle, and wild animals. Hyde Salter¶ tells a story of a clergyman in whom an attack was always induced by the vicinity of a dead hare, and hence was always able to detect a successful poacher. This gentleman once had a severe attack in consequence of a hare skin placed under his sofa as a joke. H. Charlton Bastian, also, in the *Philosophical Transactions*,¶ relates like effects as invariably produced on himself while working at the anatomy of the *Ascaris megalocephala*, or "mange" insect of the horse. Ringer and Murrell report the case of a gentleman, aged 24, many of whose relatives suffered from "hay" fever, one sister being a "cat asthmatic." He was always made worse by the vicinity of a horse, or persons that had been about stables, and one night an attack suddenly supervened in a theater, without any appreciable reason, until suddenly a horse galloped on to the stage, when he was forced to leave the building.

The following case taken from Ringer and Murrell\*\* is unique. A gentleman of neurotic temperament, about the age of 50, suffered from acute pleurisy, the result of exposure to cold and wet while out shooting, and ever afterward was subject to what he called "hairy caterpillar asthma." If by any chance he touched a caterpillar, especially a very hairy one, he was immediately seized with a "hay" fever paroxysm lasting an hour or more, and that began with sneezing, itching, and irritation of the eyes and nose, with profuse watery discharge from both. He was not in the slightest degree affected by pollen, and could pass hours in the presence of animals without inconvenience. One of his daughters was a "cat asthmatic."

Several cases of interest as showing the influence of light as an exciting cause are related by the same authors, and one is also a good example of what may be called mixed paroxysmal "hay" fever or coryza, the attacks being induced not only by pollen but by other causes. "The widow of a clergyman has suffered many years. The attacks occur all the year round, but are most severe in summer. They often occur the first thing in the morning, as soon as she begins to move in bed. They are excited at any time by grasses, roses, privet, and in less degree by other flowers. Driving in the face of a strong wind will always bring on an attack. Any dust, especially that of a bedroom, is equally efficient, and sunlight is also a frequent exciting cause. Food at once affords relief, even when no stimulant is taken, the symptoms subsiding before the meal is finished. She never catches cold in the head, and the chest is not usually affected. The attacks last from one to two hours, and are followed by great exhaustion, but are always aborted or relieved by going into a dark room. It is worth mentioning that her daughters suffer from the same complaint."††

These are exceptional cases which might be multiplied by citations from different authors. The ordinary "hay" fever or paroxysmal periodic coryza—which seems a more appropriate title—is of annual recurrence, and returns oftentimes on the same day each season, almost at the same hour, in each individual; in very few cases is there a variation of more than a few days. But it is not of equal severity in each year, since it is more or less dependent upon the character of the season and meteorological conditions; and in some never exceeds in severity a mild cold, while in others it is a most serious affair, perhaps attended with profuse expectoration of mucus streaked with blood.

About the 20th of August, usually, in the United States, the sufferer experiences an itching of the mucous membrane of the eyes, upper throat, and nostrils, which at times becomes so intense as to be almost unbearable, accompanied by inordinate and most comprehensive sternutations, and often without apparent cause, though frequently provoked, seemingly, by a bright light, cool current of air, or trifling exposure, such as tends to ordinary catarrh.

At first the paroxysms are infrequent and of moderate severity, but soon the intervals between the accessions are shortened and the manifestations become more and more violent.

Sneezing may begin while dressing or at breakfast, the attacks being prolonged, but unaccompanied by the grateful sense of relief that ordinarily attends such manifestations. Further, over-exertion seems to intensify the paroxysms and the feeling of discomfort induced; at the same time there is a slight acceleration of the pulse, with general slight febrile excitement, hence doubtless the title "fever" that obtains frequently with one or the other of the popular adjectives prefixed. In a week or ten days, probably, symptoms of bronchial irritation supervene, with dryness and injection of the throat, followed by a tickling cough that rarely results in any amount of expectoration. The latter, after a time, is more severe and paroxysmal in character, not infrequently inducing severe pain and soreness in the chest, which may or may not be materially relieved by the establishment of an expectoration. Like the catarrh or coryza, the bronchitis varies in intensity in different individuals, and also in the same individual in different years.

In many cases, after a most harassing experience, extending over ten days or a fortnight, both the coryza and bronchitis lose their severity, though by habituation they are likely to hang on more and more persistently with each succeeding autumn. In the former instance,

the coryza entirely disappears, and while the cough and bronchitis may persist as a most exasperating tickling, especially toward nightfall and in the evening, convalescence gradually merges into recovery lasting until the next season rolls around, the whole course of the disease having lasted but three or four weeks. With the latter, and most old "hay" fever sufferers, especially if the gamut of sedative remedies has been well gone over, relief is only obtained by the advent of frost and cold dry weather, the disease perhaps persisting six or eight weeks. This is the experience of the father of the author. In many, perhaps a majority of cases, the advent of cough is accompanied by asthmatic symptoms of more or less severity, beside which every other discomfort palls. Indeed, more harrowing asthmatic manifestations than accompany this malady are rarely or never witnessed.

"Hay" asthma is apt to exhibit many vagaries. It may be absent one year, only to recur the following season with redoubled severity, from some specific cause or extra irritation. Usually it supervenes between the 25th of August and September 1, first manifesting itself after a severe fit of coughing, change of wind and weather, or from some unusual exertion such as running up stairs, and is a source of greater or less torture and torment until dissipated by cold weather or other atmospheric changes.

There is always manifest difficulty in breathing, accompanied by true asthmatic gurglings or râles, though exploration of the chest by means of percussion reveals nothing more than increased resonance, indicative of the presence of air in the intercellular lung tissue, while the ear detects dry, cooing, sibilant murmurs forcibly suggestive of a "kist o' whistles;" in fact, these sounds are frequently clearly audible at considerable distance, and greatly intensified upon the approach of a paroxysm, of which, in connection with increased difficulty in breathing, they give warning.

Those who have never seen or felt these paroxysms can have no idea of their severity. It is impossible for the sufferer to find any position of comfort or relief; he cannot lie upon his back, or even recline in an easy chair. Whether sitting or standing, and wherever overtaken by the paroxysm, he seeks a firm object on which to lean his wrists or elbows, and gasps for breath. Now the sonorous chest sounds gradually subside, while inspiration becomes inaudible and lengthened, and expiration correspondingly shortened and hurried. He is quickly all but overcome by exhaustion, but the struggles in effort to secure the desired supply of oxygen are unrelaxed, since they are to a certain extent involuntary.

This may last for a period varying from a few moments to hours, and relief is obtained only as the wheezing sounds again assert themselves, being accompanied by less hurried respiration and mitigation of the feeling of impending suffocation. If the improvement is not interrupted by another paroxysm, the expression of relief replaces that of suffering and anxiety, and the unfortunate is apt to fall asleep without much care or reference as to position, place, or comfort.

Many causes operate to produce these conditions. A well understood physiological fact is that an inflamed condition of the mucous membrane in one portion of the body excites irritation in the same tissues throughout the economy generally: consequently the catarrhal condition that obtains to the nasal passages—often seems to commence with the conjunctival membrane of the inner corner of the eye—creates disturbances by sympathy and extension that, to the uninitiated, seem phenomenal, if not impossible. It is by such extension that asthmatic and bronchial phenomena are induced, and in like manner the ears, digestive tract, and urinary passages suffer. The father of the author suffers excruciatingly from this malady, and the first evidence of an inception of the asthmatic attack is derived from more intense itching and irritation at the inner corners of the eyes, with frequently manifest inflammation of the mucous membrane of the lids, including the outer eye tunic, and a perfectly maddening itching of the back of the soft palate, extending via the Eustachian tube to the ear. In one instance under personal observation, a more than usually severe morning paroxysm, such as is always apt to occur on rising, induced rupture of the capillary blood vessels in the lachrymal caruncle or prominence of the tear duct of the right eye, and caused engorgement of the organ and displacement of the visual axis, entailing double vision for some days.

Among the most marked results arising from this malady, also, are the direct and reflex changes in the vocal as well as respiratory apparatus, varying from loss of *timbre* and harshness to complete inability to utter the nasal vowels and consonants. The voice may further become husky or hoarse on account of the superintention of inflammation of the larynx from the action of cold and impure air during oral respiration, that speedily extends to the bronchi. Nasal obstructions, in short, seem to me one of the most important and generally overlooked causes of the attacks of bronchitis and asthma, acting either reflexly by causing dilatation of the vessels of the bronchial mucous membrane, or by direct extension of inflammation. Voltolini's discovery that in certain instances nasal polypi had clear casual relationship to asthma has received such ample confirmation that its truth may be considered as indubitably established. More prolific even than polypi are the erectile tissue tumors, often so small that their existence remains unsuspected until made manifest by accident.

The area over the inferior of the top-shaped spongy (*turbinated*) bones of the interior of the nose, and the contiguous portions of the septum, by some are considered as most likely to induce reflex irritation, owing to the fact that here is present an excess of erectile tissue, though my own experience leads me to believe that the posterior part of the area, and the corresponding part of the septum, is chiefly at fault; irritation of any part of the mucous membrane, however, under certain circumstances may induce such phenomena.

Asthma and cough, then, are induced by mechanical irritation of a hypersensitive mucous membrane, which may be due to the presence of polypi, erectile tumors, or to thickening of the membrane such as is induced by the simpler form of "hay" fever, particularly when the position of the head is such as to permit occlusion of the cavernous sinuses and cause increased turgescence of the mucous membrane. This is most apt to occur in the lateral recumbent posture, and explains why these

attacks, as well as the stuffiness of the under nostril, occur so frequently during sleep, and more especially toward morning. Sneezing and a copious flow of mucus from the nose usually precede or accompany these attacks of asthma and coughing; and sneezing in itself is a reflex act due to irritation of the fifth nerve; and while it may be induced by irritation of nerves in other parts, is usually of value as indicating the precise locality of the irritation of the nasal mucous membrane. The very fact of the simultaneous occurrence of hypersensitiveness of the nasal mucous membrane, such as always occurs in "hay" fever that is accompanied by cough, asthma, or bronchitis, inculcates the necessity of a careful examination of the nasal cavities before undertaking any radical measures of treatment. It is not always possible to say whether this casual relationship obtains in a given case characterized by the presence of both pulmonary and nasal disorders, but it is in favor of its existence if the symptoms alluded to precede the respiratory attacks, or if mechanical irritation of the nasal mucous membrane at other times than during "hay" fever indicates hypersensitiveness, and more so if it invariably provokes a reflex act such as cough or prolonged sneezing. A nervous basis is probably an important element in most of these cases, for not a few are manifestly hysterical, or of hysterical origin.

One thing that markedly distinguishes "hay" fever from other catarrhal maladies of similar nature is its geographical relations. It does not exist over the whole of the United States or Great Britain, yet it is a matter of difficulty to attempt to define its exact limits. Numerous portions of England are immune, especially the high land and sea coast and all or nearly all of Wales and Scotland. In America it obtains to the north of Lake Ontario in limited degree, but not on the upper side of the St. Lawrence; scarcely at all in the province of Ontario north of the Welland canal, until the Detroit river is reached, and is wholly unknown to regions above the outlet of Lake Huron. In Michigan, however, it follows Lake Huron to above Saginaw Bay, fluding victims even at Alpena, though residents of Cleveland, Detroit, Port Huron and Saginaw are here usually immune. On Lake Michigan its effects are lost above Ludington, while over on the Mississippi, in Wisconsin, it is felt as far north as the junction of the Chippewa, and in some seasons extends in a mild form to St. Paul, Minnesota. To the south it extends to the latitude of Memphis in the west, Knoxville in the central area, and Cape Henry on the Atlantic. In all this area there are immune districts at high altitudes, such as the Green, White, Adirondack, Alleghany and Catskill mountains, and the southern New York region. Isolated spots where the malady prevails are found about Galveston, Texas, St. Augustine, Florida, Montgomery, Alabama, and Milledgeville, Georgia. Beyond the Mississippi, evidence and data are almost wholly lacking, but several persons have suffered at Denver, Colorado Springs, and Golden City.

I now come to the most important part of this paper, the relief and palliation of the malady. Yet when one considers in detail all the facts and theories embodied with a view of formulating an intelligent plan of treatment, he finds himself encroaching upon most difficult ground. Not the least of the trouble is the fact there are at present held by authorities two more or less opposing views as to the causative significance of nasal disease in "hay" fever. Certain authors and specialists, as Hack,\* Daly,† Bosworth,‡ Sajous,§ etc., insist that some nasal abnormality or deformity is always present, inducing the attacks. But here, one may ask with P. McBride:¶ "What is a normal nose?" "The question may appear absurd," he adds, "but I am willing to run this risk if, by putting it forward, I can do a little toward moderating the enthusiastic zeal with which certain surgeons attempt to alter the nasal apparatus of their patients in conformity with what each individually deems an ideal normal nose. For ten years I have examined the noses of all cases of middle ear disease that have come under my notice, in private, hospital, and dispensary practice, and have found that even when changes are present that to the specialist's eye would appear very grave, the patients frequently suffer no untoward or unpleasant symptoms—that in a large number of cases, marked changes may exist without the presence of discomfort referable to the nose; and these lead me to believe that deviations from normal are by no means always to be regarded as fair game for the operator."

I re-echo Doctor McBride in the belief that in "hay" fever no supposed abnormal condition of the nasal passages should be regarded as a cause, when persistently present in otherwise healthy individuals, without reference to season or time, and that at other times than the "hay" fever season induce no discomfort. More than one sufferer has had occasion to bewail the loss of the special sense of smell owing to such interference, and without any definite mitigation of his malady. Nevertheless, there are instances as well, where cauterization or excision of the sensitive areas of the nasal passages is of decided benefit, of which more anon.

It is perhaps needless to remark there are no absolute cures for "hay" fever except removal outside of the areas where the malady obtains; that is to say, apparent cure in one year is no evidence of non-recurrence the year following; and the remedy that was efficacious one season may prove wholly inert the next; or that relieves one individual to-day is totally inadequate to the needs of another to-morrow; in fact any form of treatment where attempt is made toward general application is sure to illustrate the correctness of the old proverb, "What's one man's meat is another's poison."

Theoretically, the objects to be achieved are threefold: The soothing and strengthening of the general nervous system, the allaying of local irritability, and the removal of the exciting cause. The two former are of course palliative chiefly, while the latter [and to a certain extent the first may be conjoined] presupposes radical relief.

To remove the exciting cause, or, to speak more properly, to remove individual susceptibility, is to pre-

\* "Principles of Prac. Med." London.

† *Br. Med. Jour.*, June 16, 1888.

‡ *Ibid.*

§ *Br. Med. Jour.*, June 23, 1888.

¶ "Asthma," by Hyde Salter, London.

¶ Vol. clvi., p. 583.

\*\* *Br. Med. Jour.*, June 23, 1888.

†† "Paroxysmal Sneezing," by Sidney Ringer and Wm. Murrell.

\* *Wien. Med. Wochen.*, August, 1883.

† *Med. and Surg. Reporter*, December 20, 1884.

‡ *Archives of Laryngology*, vol. ii.

§ *Jour. of the Am. Med. Association*, 1884.

¶ "Hay Fever," Philadelphia, 1885.

¶ *British Med. Jour.*, September 15, 1888.

vent the recurrence of the paroxysms, for which there is but one definite remedy, viz.: Removal to regions outside of the "hay" fever zone. Unfortunately, however, there are many who cannot avail themselves of this advice, and who, consequently, must be ever subject to the exciting causes of the malady.

Under such circumstances the most pertinent suggestion is to follow the approved rules of hygiene; avoid as far as possible conditions that tend to aggravate, notably mental weariness and worry, which are far more potent factors than commonly supposed; and to attend strictly to the maintenance of general health, strengthening as far as possible, by tonics and other means, the weak and irritable constitution. Indigestion, commonly termed "dyspepsia," is a most potent cause in many instances, and proper food, properly digested and assimilated, has permanently relieved more than one apparently confirmed "hay" asthmatic. Sir Morell Mackenzie\* seems to place great faith in the employment of valerianate of zinc and asafetida as a tonic, nervine, palliative treatment, but I must acknowledge to have never seen any other result accruing save, as in Mark Twain's classic case, securing to the patient the "odor of a turkey buzzard." To the same end, and also with a view of producing an alterative effect, Dr. Chas. Blackley† recommends iodide of potassium with corrosive sublimate, which has been tried as a forlorn hope by many, with no better effect than a vile taste in the mouth. Arsenic, iodine, quinine, atropine, the bromides, grindelia robusta, antipyrin, iodoform‡ and the Lord knows what beside—pretty nearly everything in the materia medica, in fact—have been employed, only to mete out disappointment. However, tonics and alteratives are often valuable adjuncts, and so too are saline laxatives, and the "hay" fever ridden unfortunate will oftentimes obtain in connection with local applications decided assistance by the use of Hunyadi Janos diluted with pure water and drank hot immediately upon rising. Such narcotics as belladonna, stramonium, opium, etc., singly or in combination, are much lauded, and may give partial relief while one is under their immediate influence, but the dangers and drawbacks are such that the malady is a preferable choice.

Local applications are as a rule somewhat more successful as palliatives. "Hazeline," or extract of witch hazel, anthoxanthum and other tinctures of homeopathic origin, based on the imaginary law of similars and belief in dynamic therapeutics, have been widely puffed and advertised by dealers and manufacturers with all the zeal of that philanthropy which has for its inception a plethoric pocket book; but are all next to useless unless combined with strong faith cure, are very painful if employed undiluted, and wholly valueless when mixed with water. Muriate of quinine taken internally is sometimes of benefit, especially if combined with dark euonymin, from its effect upon the secretions of the economy at large, but employed as a snuff, or in an ointment, quinine in my experience always appears to aggravate the trouble. Chloroform, or chloroform spirits, is the sheet anchor of many of my acquaintances, and causes much mirth among ribald friends when the unfortunates copiously besprinkle their pocket handkerchiefs from a bottle constantly carried in the pocket. Were there no other remedy this would be a great boon, though there are many unpleasantnesses connected therewith, notably its bad effects upon the nervous system.

Iodine as an inhalant affords some slight relief in many cases, but not near so much as a bottle of strong smelling salts, made with carbonate of potassium and glacial acetic acid, to which a few drops of Parke, Davis & Co.'s antiseptic cologne is often a decided addition. A good snuff with many people cuts short the paroxysm at once, but the salts must be as powerful as they can be made. I would suggest iodide of ethyl also, as a decided means of relief for those who bear iodides well and suffer from "hay" asthma.

Cubeb cigarettes are also very comforting; indeed, if one be smoked in a small room and the doors and window kept close, tolerably complete immunity for the time is assured.

The remedial powers of arsenical preparations, both locally and internally, have been widely vaunted, but I can only say that none have ever seemed to me to have had the least influence, though I doubt not that Fowler's, Pearson's, or Donovan's solution, taken thrice daily, after meals, in as large doses as can be borne without absolute nausea, may oftentimes prove valuable adjuncts to local remedies, especially the Donovan, Hunyadi Janos water being employed as well, every morning on rising.

Dr. Carl Genth [British Med. Journal, June 16, 1888] insists that almost complete immunity may be had by bathing the mucous membrane of the eyes and by employing as a douche and gargle a solution of corrosive sublimate in the strength of 1 in 3,000. My personal experience does not in the least corroborate this, and a better preparation for the same purposes is a saturated solution of borax in camphor, or chloroform water, which may also be intensified by boric acid if desired,§ and carried in the pocket and snuffed up the nose ¶ libitum. Its soothing effect upon the mucous membrane is frequently almost magical. Bicarbonate of soda in simple solution, employed in the same way, has been suggested by Dr. Newton,|| but is not nearly so good as the bichlorate [borax], or even camphor water alone.

Still another remedy that promises to be useful is peroxide of hydrogen—[the "Golden Hair Dye" of the nymphs du pave—but must be employed with caution, since if it comes in contact with the beard or mustache, an intense yellow hue results, and a dark-browed, vindictive man, six feet four in stockings, wearing a canary bird moustache, is an object of by no means a pleasant contemplation for a small-sized doctor of timid or pacific tendencies! A fifteen volume preparation used in full strength, or diluted with water, as occasion [depending upon the sensitiveness of the mucous membrane in the individual] may demand, if sprayed gently through the nasal canals, will cause the patient to snort and blow the froth from his nostrils, expelling the dissolved mucus, when the application

should be repeated, and again and again, in the same manner, until the nasal membrane is thoroughly cleansed. Next a spray of four per cent. solution of cocaine may be employed for the purpose of temporarily depleting the swollen capillary vessels of blood, when the entire irritated surface should be touched by means of an applicator [a brass annealed wire bent to an angle of 45°] wound with absorbent cotton dipped in a mixture of hydrastis, and boro-glycerin, diluted with three times its volume of Price's glycerin. This is by far the best treatment I have found except, perhaps, that indicated at the conclusion of this paper, and is in many instances successful in wholly relieving the patient of his malady after three or four applications; the first two or three times, it should be employed by a physician familiar with the use of the nasal speculum and rhinoscope, in order that every portion of the throat and nose may receive the application. Meantime the borax-camphor water should be employed for frequent washings of the eyes by means of an eye bath; likewise smoked glass "goggles" will be found of great aid and benefit.

Tobacco smoking pushed to the point of nausea, and the use of strong, clear, black coffee, are equally efficacious remedies, oftentimes, with those who are not accustomed to these luxuries, but both fail as soon as one becomes in the least habituated to their use.

The first and foremost of palliatives, however, is cocaine. I first employed this remedy three or four years ago, but abandoned because its effects appeared to be so extremely transient. Subsequently I had reason to believe the fault lay with the drug, and so began experimenting with Parke, Davis & Co.'s and Squibb's cocaines; and only those who have personally tried different preparations can justly estimate the immense difference that exists between these products and the article usually supplied by druggists. My experience, briefly, is that so far as the effects upon the nose and eyes are concerned, the two former are almost perfect, and will enable the sufferer to pursue ordinary avocations in comfort. One sufferer last year wrote, "With the assistance of a small bottle of cocaine solution, four per cent., and an inhaler, and armed with a pair of smoked 'goggles,' I have been able this summer to do what I have never before succeeded in doing, enjoy regular bicycle runs without any inconvenience worth speaking of. Without the cocaine, this would have been a physical impossibility for me, as, apart from the constant sneezing, the eyes become, when not under the influence of cocaine, and even when protected by large glasses, so swollen and suffused, by the rapid movement through the air and dust, as to render one almost blind."

Mr. John Watson,\* of Westminster Hospital, London, who suffered to such degree during the summer months that any form of labor, physical or mental, was impossible, and who only experienced relief, strange to say, in the atmosphere of the theater, derived great benefit from "tabloids" of cocaine which he introduced into each nostril, pushing them well up with the tip of the little finger; undoubtedly the tablets intended for the hypodermic syringe would be equally effective.

Sir Andrew Clark† records his preference for cocaine bougies made of gelatin and glycerin, each containing one-fourth grain of the alkaloid; and also a mixture of glycerin and carbolic acid, each 8 drachms, with muriate of quinine, 1 drachm, and 1-2000 part of corrosive sublimate—the whole mixed by the aid of heat and applied by means of a mop to the inflamed and irritated nasal tissues. The effect of the latter is, he says: "Sometimes nil; sometimes gives relief for half an hour, sometimes for a whole day, and sometimes for the entire season." About one-half his patients were relieved for the season, and four permanently cured. He also advises, at the same time, the administration internally of alkalies and arsenic. The experience of one patient with this treatment is perhaps worthy of recording. He writes characteristically: ‡

"Well, I have tried the mopping mixture, and as the chemist said who made it up, 'It's a powerful compound.' The first brushful on each application is very fiery to the nose, but strange to say, succeeding brushing in the same nostril is not felt, and one imagines all is going to be 'jam.' It isn't. I used it on going to bed, and it kept me awake half the night applying the 'kerchief' continual, like Androcles and the lion at the wax works. Also it was very fiery. Nevertheless, as with mixture before, I have no doubt it is a 'blessed cure.' I used it four alternate nights—24th to 30th—during which time I was tormented more or less, less on the 1st, so I thought I would give it an extra day's grace; this was Sunday, the 3d, when I spent the whole of the afternoon in the broilingsun of one of the hottest days we have had this year. But I felt no ill effects, and this was an exceedingly severe test. A fortnight previously, on a similar day, the sun brought out a frightful attack, and I could scarcely see where I was walking. This last week I have felt very little indeed of it. Got amongst some straw and dust Friday, which set me sneezing, but this soon passed away, and I think it unnecessary to mop any more. Next year, if I am a victim, I will start this mopping business on the first symptom of attack. I had given this to the 25th to exhaust itself, but now (the 11th) it appears almost done."

A four per cent. solution of cocaine in distilled water, which may require to be increased to five per cent. toward the end of the season, may be employed. When necessary, four or five drops are poured into the palm of the hand, and snuffed up into the nostrils by throwing the head slightly backward and from side to side, when the fluid may be made to practically reach all parts of the cavity: though some spray apparatus, such as Semple's inhaler, is much more convenient and certain. At the same time, by moistening the tip of the little finger, a drop or two may be introduced into the inner corner of the eye, with manifest relief to the "needles and pins" sensation. For the first few weeks of the season immunity is secured by this method, even in severe cases, for two or three hours; and as the effect of the remedy wears off, it should be reapplied.

If cocaine only had its local effect, there would be very little more to say than, "A palliative is at hand which for all practical purposes is perfect." But there is unfortunately another side to the picture, since, be-

sides its local effect, the drug is a powerful nerve stimulant. I am not now, it must be understood, referring to the untoward effects induced by a single dose owing to the idiosyncrasies of individuals, but from continued use.

During the first few days the effect is ordinarily delightful; within a minute or two after absorption, all sensations of bodily or mental fatigue are removed, producing apparently a most pleasurable capacity for work; nevertheless, it will be found impossible to perform any act that requires great concentration and mental effort—the mind wavers, becomes uncertain, and suddenly the "hay" paroxysm unexpectedly asserts itself: meantime there is very little appreciable reaction. After a short time, however, conditions change: The drug acts less satisfactorily, requiring stronger and more frequent applications, coupled with great reaction—if one has an excess of work, the prostration incident to reaction is very severe; the appetite is decreased; sleeplessness induced; the heart's action rapid and unsatisfactory; and the whole nervous system brought into a highly strung, over-wrought condition. This is not in the least an over-drawn picture, and so strongly has it been impressed upon Mr. Bertran Windle,\* of Queen's College, Birmingham, an intense sufferer from "hay" fever, that he last year declared himself in these words before the Birmingham and Midland branch of the British Medical Association: "In spite of the great annoyance and suffering produced by the malady, and the relief afforded, I am very doubtful whether I shall venture to run the risk of using cocaine another season. I can readily understand from my own experience what is meant by 'cocaine habit,' and I lay my views before the brethren in the profession as a warning against the rash use of the drug. I should say the lesson I have learned is, that whilst cocaine as a remedy affords palliation, perfect for all practical purposes, it is a drug whose use is accompanied by so many collateral disadvantages as to make it very doubtful as to whether its continued exhibition, during five or six weeks, is a line of treatment which is safe or justifiable to enter upon."

I had intended to ignore the drug known as analgesin or antipyrin entirely, but on second consideration I will state the facts connected therewith. Like chloral and some other remedies, it often has a decided soothing or anesthetic effect upon the mucous membranes of the body when taken internally in large doses, but it is an unsafe remedy, frequently inducing profound and dangerous collapse by its interference with the heart's action; especially is this true of Knorr's antipyrin.

There are two remedies, however, that may be employed to replace cocaine, and successfully in most instances, viz., brucine and menthol. The former will give all the soothing effect, while the latter may be employed to continue it. A camphor water, two to five per cent., solution of brucine is perhaps best, while the menthol may be employed as strong as can be borne, or as required to meet the indications in the individual. Both are safe and in no way tend to habituation: and as aids I would advise the Hunyadi Janos; quinine and euonymin, adding perhaps hydrastis; simple but liberal diet, with but very moderate indulgence in malt or spirituous beverages; and as perfect freedom from mental worry as possible. That paroxysms may be repressed by mental effort, on occasion, is not to be doubted, and with many, immediate amelioration is had by retirement to a dark room.

Again, those cases in which there is decided swelling and thickening of the nasal tissues are effectually treated by caustics oftentimes—by the application of the galvano-cautery heated to cherry redness, or by touching with glacial acetic acid. A still milder measure, and one that is practically painless, is recommended by Dr. W. H. Daly, § of Pittsburg, which consists of the local abstraction of blood from the swollen tissues by means of a small, fine knife, similar to that employed for incising the cornea in the extraction of cataract from the eye. I have had no personal experience with this, but it certainly commends itself, as does any method that will permit of restored free nasal respiration and reduction of sensibility in the hyper-sensitive areas of the parts. Sneezing paroxysms that terminate in hemorrhage are almost invariably followed by relief. Indeed, I am inclined to believe that free application to sensitive area of the inferior turbinated bones and posterior portion of the nasal septum will permanently relieve "hay" fever, from the fact that one patient who suffered thus before the growth of polypi was entirely cured by the subsequent removal of these growths, and another obtained equal immunity by an injury that caused extensive ulceration and sloughing of the posterior border of the nasal septum. Probably, also, in many instances, the daily application of Sir Andrew Clark's carbolic-sublimate mixture for some days prior to the onslaught of the malady will prove effective for that season, or so nearly so that merely a mild menthol spray, employed after a thorough douching, will be entirely satisfactory. At the same time the mucous membrane of the inner corners of the eyes should be carefully washed every morning with soft water, and thoroughly saturated afterward with a mild solution of corrosive sublimate [1 to 3 000] or borax in camphor water. Where the disease affects the ear also, the Eustachian tube and middle ear may be inflated by means of Politzer's inflation apparatus, with the vaporizer attached containing spirits of chloroform. By such measures, one may confidently expect relief consistent with tolerable comfort, and sufficient to permit attendance to ordinary daily occupation, and above all relief from that peculiar feeling of aprosexia, or mental lassitude, that constitutes inability to fix the attention upon any one subject, and which is so constantly a concomitant of this malady.

ENGLISH gold coin is so depreciated by wear that a banker who recently accepted £1,000 in gold half sovereigns, upon depositing it found it short weight by £19.

\* "Hay Fever," London, 1884.

† London Lancet, August 27, 1881.

‡ G. Hunter Mackenzie in Br. Med. Jour., June 16, 1888.

§ Boric acid added, permits a greater addition of borax.

¶ Cincinnati Lancet and Clinic.

§ Suggestions of Dr. Robt. T. Morris, of N. Y.

\* British Med. Jour., June 23, 1883.

† London Lancet, vol. 1, 1887, p. 1170.

‡ Br. Med. Jour., July 23, 1887.

\* Birmingham Med. Review, Dec. 1888.

† The Practitioner, London, 1888.

‡ There is a third drug, *coloine*, that promises apparently to be even better than cocaine or brucine, though my personal experience therewith has not been sufficient to warrant any very positive assertion as to its value. It is certainly worthy of extended trial.—AUTHOR.

§ Med. and Surg. Reporter, Nov. 17, 1858.