

wise and well-trained public officials, through efficient health organizations, and lastly through the intelligent coöperation of the citizen. Is it a utopian scheme to hope for such intelligent action and large acceptance of the principles of sanitation as are here outlined? Let those answer who have witnessed the progress of preventive medicine within the last quarter of a century. So long as human society is cradled in the lap of ignorance and folly, just so long will its growth be hampered by its surroundings, but as society rises in intelligence and into the liberty of a rational and enlightened conception of its wants and necessities we may expect it to accept and adopt those higher principles of social government which will perpetuate its existence in the most perfect form. The conclusions which may be drawn from the foregoing general consideration may be summed up in brief as follows:

1st. The doctrine that diseases of the puerperium and the pathogenic processes following surgical procedures are of bacterial origin is now universally accepted by scientific authorities. This opinion asserts the idea that diseases are of septic origin, that they are introduced from external influences and do not originate *de novo* in a given case. This view annuls the doctrine of spontaneous development of microorganisms and traces their origin to antecedent conditions.

2nd. The acceptance of the doctrine of external origin of microorganisms implies the necessity of preventing their cultivation and propagation before they have gained access to the human economy.

3rd. The science of sanitation has for its mission the destruction of microorganisms and the prevention of all pernicious influences which would arise from their propagation.

4th. The principles of sanitation are entitled to the utmost consideration and enforcement in all methods of medical and surgical work. These principles insist upon the employment of every known means of preventing and of arresting diseased processes dependent upon bacteria by the removal of all conditions which favor the development and conveyance of such bacteria.

5th. The medical profession is now fully cognizant of the various agencies through which diseased germs originate and the numerous channels through which they are introduced into the human economy. It therefore becomes the solemn duty of the medical profession to give full support to the teachings and principles of preventive medicine and to advocate the fullest acceptance of such teachings and principles by the general public through regularly organized channels of public sanitation and through appeals to intelligent citizenship.

ONE YEAR OF ACETANILIDE IN PEDIATRIC PRACTICE.

Read in the Section of Diseases of Children at the Fortieth Annual Meeting of the American Medical Association, June, 1889.

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Carbolic acid and its allies, all products of coal-tar, have been demonstrated to be of great value.

Of this class none, in my judgment, are superior to acetanilide. This substance was prepared as early as 1853 by Gerhardt, by the action of aniline upon acetylchloride, or anhydrous acetic acid, but up to a year or so ago it was not known to possess valuable medicinal properties.

The discoverers of the fact—Cohn and Hepp—that the drug possessed excellent therapeutical qualities gave it a new name, supposed to be more appropriate for use in prescribing, namely, "antifebrin," which name is protected by patent laws, and only the authorized makers and agents can use this term.

"Acetanilide" is in every respect identical with antifebrin, but possesses this advantage, that it is cheaper, and in specifying it we do not cater to the patent medicine trade. It forms colorless, shining plates, melting at 233.6° F., boiling at 563° F. It is almost tasteless, but after a time a slight burning sensation is produced upon the tongue. It is somewhat insoluble in cold water, more readily soluble in hot water; very freely so in alcohol or alcoholic solutions.

It possesses neither basic nor acid properties, and is not readily attacked by most reagents.

In general, my experience has convinced me that acetanilide is about three times as effective as antipyrin in promptness, duration, and extent of action, and is certainly less depressing and correspondingly dangerous. I might readily pay tribute to the value of the drug in adult practice for the relief of violent neuralgias, facial and sciatic; high grade fevers, typhoid and malarial; the discomforts of gout and rheumatism—but this is not the object of this paper.

It is my purpose to present the epitome of one year's experience of the use of acetanilide in the treatment of diseases of children. This experience is a complete endorsement of the announcement of Widowitz in favor of its peculiarly safe and steady action in children up to 4 years of age, or twice or thrice the amount in those older.

When the drug is given for its analgesic effect, where the temperature is normal, it requires eight times the amount to secure the fall of one degree of temperature that it does when fever is present.

At the last meeting of the British Medical Association, at Glasgow, Scotland, Dr. J. Theodore Cash made a most elaborate report in the Section of Pharmacology and Therapeutics upon acetanilide and its kindred. He stated that when it is

given in doses of not more than $\frac{3}{4}$ gr. for every 2 lbs. of weight of the individual it is free from danger; in doses of ten times that amount it is toxic, causing great fall of temperature, twitching of the muscles, and death. The action upon the spinal cord is decided, its reflex irritability being greatly impaired. Ultimately anæsthesia is produced.¹

The irritability of motor nerves is greatly reduced or even suspended by the action of acetanilide; muscular irritability and contractility are markedly diminished. Cash states that large doses produce a marked change in the blood, methæmoglobin becoming abundant, while oxy-hæmoglobin is greatly reduced. He states that it is questionable in how far the presence of an impurity may lead to this result and to the accompanying cyanosis, which was observed by Germain Sée and others.

In some instances good-sized doses have produced marked cyanosis, which is the one disagreeable feature of the drug, but this has been exceptional; but even when it occurs many observers have given evidence that it is not important.

In the majority of instances I have furnished the drug myself, as is my custom when administering any new remedy (where I desire to be sure of its being reliable, and to limit and control the amount taken). When prescribing the drug, by specifying that furnished by Lehn & Fink, of New York, I have rarely had the cyanosis result.

In administering the drug to children I have in many instances taken the 5 gr. tablets of Hazard & Hazard and triturated them with sugar; being tasteless, the administration is easy when combined with the sugar, and the dose can be regulated as desired. If depression be present, small quantities of brandy may accompany it.

I have found the following formula agreeable and desirable:

R. Acetanilide (Lehn & Fink)	30 grs.
Alcohol	3 drachms.
Glycerine	2 "
Aquæ cinnamon.	3 "
Syr. tolu	1 oz.

M. Sig. One or two teaspoonfuls every two or three hours, as may be desired.

Although it is probable that the drug diminishes the number of the red blood corpuscles, yet it requires a long administration of large doses to produce a condition of anæmia, and even if this should result it is very amenable to treatment.

Some of the observers have stated that of the various pyretic affections which would appear to indicate the administration of acetanilide, but which derive the least benefit from it, may be mentioned

SCARLET FEVER.

My experience does not bear out this statement. A record of fifty cases of scarlet fever wherein the temperature was controlled pleasantly and sat-

isfactorily has been made during the year. I will not weary you with the presentment of the dreary details of all the cases, but furnish a typical one, and present conclusions based upon the complete record.

I. C., æt. 5 years, taken suddenly with vomiting and high fever. Examination revealed a temperature of 104° , pulse 120, sore throat, headache, and general discomfort.

Administered appropriate remedies to allay irritability of throat and stomach, and to control temperature gave $2\frac{1}{2}$ grs. of acetanilide every two hours, to be given regularly if awake.

Second visit made at end of twelve hours, and during interval 10 grs. of remedy had been taken. Temperature was 101° , patient had passed a comfortable night, a well pronounced rash was present, and a clear case of scarlet fever was announced. By the use of the acetanilide the temperature was kept in the neighborhood of 100° . All the symptoms were rendered more mild.

The uniform result in all the cases justified the conclusion that in acetanilide we have a remedy whereby we can surely and safely modify and soften the asperities of scarlet fever.

It is of course a fact admitted by all that scarlet fever has a definite career to run. No one should think of aborting a case of scarlet fever any more than they would of healing a broken bone in a shorter time than a month or six weeks, but we should realize that we can lessen the danger to our patient by guarding him against high temperature or the continuance of a fever which "melts down the body tissues and endangers life from the accumulation of the products of nitrogenized waste in the blood."

MEASLES.

I present the following as typical of a series of cases:

M. G., a female æt. 10, a spoiled child of luxury in a wealthy family, all the other children of which were full grown. Taken ill December 6, 1888. Sent for physician who pronounced the case one of measles, and left instructions that plenty of hot drinks be given and the room kept dark until the case had terminated. After two days and nights of restless, burning agony, no sleep, constant coughing, and the child in a frenzy of discomfort, I was summoned. I found the little girl tossing from side to side almost delirious, a most terrible burning itching present, coughing incessantly, a burning thirst, to relieve which only hot drinks were being given. Pulse 130, temperature 105° .

At once ordered cool drinks and a 5 gr. dose of acetanilide, to be repeated every two hours if awake. At next visit in the morning found that the little girl had passed a comfortable night, 10 grs. of remedy had been taken, pulse was 90 and

¹ Therapeutic Gazette.

temperature 100°, almost no disposition to cough. Itching of skin completely subsided. Two or three days of treatment terminated the case satisfactorily.

Forty-six recorded cases of measles wherein the drug was used and a large number not recorded, corroborative, present arguments to justify the opinion that acetanilide serves admirably to reduce the high temperature, tranquilize the nervous system, and allay the irritation of skin and mucous membranes present in measles.

CONGESTIVE FEVERS.

Twenty cases of congestive form of fever, possibly of malarial origin, with temperature ranging from 105° to 107°, accompanied by convulsions, successfully treated, wherein acetanilide played a most important part, could be presented, but one case in detail will serve to illustrate the whole set.

M. B., æt. 2 years, taken May 10, 1889, with severe convulsions. Physician summoned, found child in convulsions and receiving the stereotyped hot bath. Examination revealed a pulse of 140 and a temperature of 106°, a constipated condition of bowels. At once he gave an emetic and an injection, with a view to opening the lower bowel, and a calomel purge. Temperature ranged from 103° to 106° for five days, at end of which time I saw the case in consultation with the attending physician. The temperature was 104° at noon, pulse 130, delirium present, bowels were freely open. Aconite and quinine, together with calomel, had been freely given, also bromides to produce rest. The conditions strongly pointed towards meningitis.

I suggested a continuance of the calomel in infinitesimal doses ($\frac{1}{20}$ gr.) every few hours, also 5 grs. of acetanilide at once and to be followed by 2½ grs. every four hours and oftener if necessary to keep the temperature at 100°. If depression were present at any time, teaspoonful doses of brandy every two or three hours were to be given.

At next visit, made at noon the following day, it was found that 5 grs. every four hours had been necessary to keep temperature at 100°. Pulse was 90 and good volume; a few teaspoonfuls of brandy had been given. Delirium had subsided and child had rested fairly well. A chill at midnight, followed by a disposition towards higher temperature, suggested malaria, which had previously been suspected as being the *casus belli*, and pointed to the necessity of quinine, which was ordered in 5 gr. doses in mucilage per rectum every four hours.

On the following day the patient was in a better condition; the chill had not occurred as on the previous night. A continuance of the treatment, varied according to the conditions, left the patient convalescent at the end of ten days.

A very important factor in this case was, I think, the acetanilide.

In fevers the administration of the drug secures a slowing of the respiration and the pulse; arterial tension rises, diuresis and diaphoresis occur, pain is relieved, and sleep usually ensues.

The calming effect upon the nerve centres is of great value in these conditions, I think.

We know that sweating is not common in the fever of children. William Pasteur has suggested that the pungence of skin which is often met with may be partly due to this peculiarity.

Dry skin, contracted cutaneous vessels, conditions which tend to prevent a rapid loss of heat, favor elevated temperatures and are elements of danger to the child.

A brief quotation from Pasteur's excellent article on "Fever" in Keating's Cyclopædia, will be pardoned. He says: "The nature of the relations of the central nervous system to thermogenesis and thermolysis is still very imperfectly understood. Our knowledge in this direction is chiefly based upon experimentation on animals. Careful experiments have demonstrated the presence at the anterior part of the caudate nucleus, near its median convexity, of a tract which, whenever it is stimulated by puncture with a fine needle or by an electric current, gives rise to an increase of the body temperature, which persists for some time and is attended by an increase of the amount of the oxygen absorbed and of the carbonic acid given off by the animal. It has been shown by calorimetric experiments that this pyrexia is not due to vaso-motor disturbance, causing retention of heat, but that there is an increase in heat production. At the same time the pulse and respiration rates are raised and the elimination of urea is increased.

"It appears, therefore, that puncture of the caudate nucleus produces in certain animals a pyrexia which possesses all the essential properties of fever regarded as abnormal elevation of temperature. The value of this experiment in support of the neurotic origin of fever can hardly be overestimated. Some valuable evidence is also forthcoming on the clinical side. In this connection it will suffice to recall the fact that there are on record well attested cases of cerebral tumor, pontine hæmorrhage, softening hæmorrhage in or about the basal ganglia, injuries of the spinal cord, tumors of the spinal meninges, and others, in which very high temperatures have been observed—temperatures for which no other cause was discoverable than the nervous lesion with which the patient was affected."

No one can doubt that there is a close relationship existing between the nervous system and heat production and heat regulation.

In fact, it is practically accepted that "there exist in the body chemical processes, resulting chiefly in the production of heat; that these processes are under direct control of the nervous system and possibly of special thermal nerves;

and lastly, that there are regions in the central nervous system which are in some way connected with these nerves, and through them control the chemical processes resulting in heat production."

The more we study the fever problem the stronger the conviction that a large part of our treatment should be directed towards tranquilizing the nervous system and aiding elimination, not forgetting nutrition.

In acetanilide we have a remedy, I think, which reduces high temperature by its beneficial effects upon the nervous system.

In this drug, carefully and judiciously used in conjunction or alternating with the cooling bath or the wet sheet, we have the sheet-anchor of safety to our fever patients.

WHOOPIING-COUGH.

It is surprising that the opinion obtains so freely among the people that this disease is a trifling one and not much amenable to treatment.

We do not need to refer to the mortality records of England and Wales, which are so perfectly kept, and which prove that whooping-cough ranks third in the fatal diseases of infancy in England.

The complications which may accompany the disease are the cause of its fatality. Whether the microorganism of pertussis described by Burger, of Bonn, be established or not, there can be no doubt of the fact that the disease is caused by a special germ.

In our treatment the most we can do probably, as yet, is to guard our patients from the possible complications.

After treating fifty cases of whooping-cough with acetanilide, I am convinced we have a valuable remedy for the disease. Given in doses of from $2\frac{1}{2}$ to 5 grs. every two to four hours, according to age, we can materially mitigate the severity of the paroxysms and reduce their frequency. By the judicious administration of the remedy, coupled with proper attention to diet, clothing and an open state of the alimentary canal, we rob the disease of three-fourths of its discomforts, terrors and dangers.

CONVULSIONS.

In November, 1888, in a paper read to the McDowell Medical Society, of Kentucky, on "Infantile Convulsions," I testified as follows: "In acetanilide I am sure we have an excellent remedy for the relief and prevention of convulsions. Clinical experience for one year justifies the conclusion. In confirmation of my own experience of its value in the convulsive diseases, I note the fact that Dr. H. H. Moyer, in the *London Medical Record* of August 20, 1888, reports favorably on its use in epilepsy, in 5 gr. doses three times daily."

Seven months' additional clinical experience endorses the position taken above.

CHOREA.

Three cases of chorea in girls ranging from 7 to 14 years of age have been more benefited by the acetanilide—in doses of 5 grs. from three to four times daily, as indicated, coupled with proper nutrition and tonics—than by any other plan of treatment. The recovery was more prompt.

After more than eighteen months' experience in the use of acetanilide for many of the febrile, spasmodic, and painful disturbances of childhood—a record of its use upon 600 children, together with at least 500 unrecorded cases, kept for purpose of comparison with past experiences with other drugs for similar conditions—I feel justified in arriving at the following conclusions:

1. Acetanilide, carefully guarded and properly used, is a safe and reliable remedy in the diseases of infancy and childhood.

2. Whether used for the antipyretic, analgesic, or sedative effect, it is preferable to antipyrin in that the result secured is of longer continuance and the depression is not so great.

3. The cyanosis which sometimes results from its liberal use is not uniform, and, while it is not an agreeable feature, my experience corroborates that of other observers to the effect that it soon passes off and is not accompanied by danger.

4. It is not desirable, in reducing temperature, no matter what means be employed, to use them in excess to the extent of securing sudden and great reduction. Especially is it preferable, in using acetanilide for antipyretic purposes, to give it in medium doses to the extent of keeping the temperature down to a reasonable point—in the neighborhood of 100° F. It is better to give small doses and repeat them more frequently, rather than large ones at long intervals.

5. It is of great value as a controller of temperature in the various fevers, whether they be caused by the typhoid germ, malaria, or the exanthemata.

6. It serves almost as a specific in whooping-cough, not in aborting the disease, as it has a definite course to run, but in mitigating the discomforts and controlling the paroxysms of the same.

7. Acetanilide, while of great value and surely safer than antipyrin, is no exception to the rule that obtains with all drugs. It should be handled carefully, administered judiciously, and under no circumstances should the public be educated in its use.

The time has come for the profession to call a halt and endeavor to check the reckless use of medicines upon the part of the people. The secular press, in disseminating information regarding the action of drugs, gleaned from medical sources, is to a large degree responsible for the drugging habits of the people; but the medical profession is not blameless in the matter, in that many physicians verbally advise the pur-

chase of many drugs by their patients, and carelessly and thoughtlessly impress them with their harmlessness.

8. Medicines, which are nothing more than the tools by which the physician hopes to accomplish certain ends, should no more be left in the hands of an uninformed lay public, to use at their pleasure, than should the equipments of a surgeon's office or the accoutrements of a standing army (all intended, if properly used, as a protection to the lives of the citizens) be recklessly placed in the hands of children, or those unskilled in their use.

If the members of our sister profession of pharmacy do not become imbued with the above thought, and act upon it, physicians may be forced to supply themselves with a part, at least, of the medicines needful to cope with disease, feeling that the attending inconvenience will be more than compensated by a knowledge of the fact that they will have a more definite control over the drugs administered to their patients.

THE AMETROPIÆ AND THEIR RELATION TO INSUFFICIENCIES OF THE RECTI MUSCLES.

Read by Title in the Section of Ophthalmology, at the Fortieth Annual Meeting of the American Medical Association, June, 1889.

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The normal functions of the orbital muscles, when the eye is considered as a monocular organ only, are complicated; when we study their actions in connection with binocular vision, their offices appear confused in the extreme; but when, in addition, there exists an abnormal condition in the action of one or more of these muscles, then we have a perplexing skein to untangle. Such has the subject of insufficiencies of the orbital muscles proven itself to be.

In seeking a remedy for an affection, we do so more intelligently by first searching for the underlying condition of which the symptoms are but the declaration. Hence in asthenopia of the orbital muscles, as in all other affections, we would, as far as possible, trace all symptoms back along the line of causation to their ultimate origin. We are thus necessitated to consider some of the most noticeable and common affections of the ocular muscles, whose conditions are attributed to refractive abnormalities.

For the purpose of being clearly comprehensible, the subject will be discussed in the following order:

1. Does an error of refraction contribute in any manner to muscular asthenopia?
2. What is the *modus operandi* of the impairment of the function of the ocular muscles in ametropia?

3. Will rendering the eye emmetropic contribute in restoring the weakened muscle to its normal condition?

The only difference between muscular asthenopia and strabismus is that in insufficiency there is temporary inability to maintain binocular vision, while in strabismus the inability is constant. Muscular asthenopia implies an inability to bring both visual lines to bear *constantly* upon one point. In strabismus there is inability to bring both visual lines to bear upon one point *at any time*. In muscular insufficiency, then, the muscle is partially disabled, and is enabled only a part of the time, and then with considerable effort, to perform its functions; while in strabismus it is totally disabled from performing these functions.

We are fully cognizant of the influence of hyperopia and myopia upon the induction and maintenance of convergent and divergent squint.

Observant oculists have noted that from 75 to 85 per cent. of all cases of convergent squint are hyperopic, and in the divergent there is even a larger per cent. of myopia. This alone adequately demonstrates the influence of the ametropiæ upon the functions of the orbital muscles.

As we all well know, it does not follow that all cases of hyperopia and myopia are the subjects of muscular asthenopia, the occupations of the ametropic having much to do in developing this affection.

In order that the eye may deviate from its normal position one of two conditions is necessary: there must be a physical or functional weakness of one muscle, or set of muscles, from which the eye is deflected, or an excessive strength of a muscle or set of muscles, toward which it becomes directed.

In simple hyperopia and myopia how is this accomplished?

2. *The Modus Operandi.*—In hyperopia the patient is compelled to accommodate in order to focus the rays of light upon the retina and make the image more distinct. The greater the degree of hyperopia the more he is compelled to exert his accommodation. Accommodation produces convergence, and the long continued effort of accommodation for this reason makes the convergence permanent.

In a few cases of hyperopia the muscle is not able to stand the long continued strain at convergence, and in order to avoid confusion of images or diplopia, the eye is instinctively turned out and entirely away from its fellow. Thus in hyperopia we occasionally have a divergent squint.

In myopia, as is well known, the patient sees well and often without effort of accommodation, when the object is brought to a very near point; hence, in order to obtain binocular vision, one or both eyes must become abnormally converged. The greater the degree of myopia, the more convergence is necessary in order to maintain binoc-