It will be noticed that the writer has not in this article made any distinction between stammering and stuttering. Stammering is best used as the general term which should include two varieties: (1) That in which the patient *stutters* in his speech; (2) that in which he *silently sticks*, making compressive efforts with his oral articulatory mechanism without emitting audible sounds. Since some authors, however, have included under the term stammering the condition known as "lalling," a few words must here be said regarding this condition, and more especially its treatment.

LALLING.

The nature and varieties of this phenomenon are very fully discussed by Wyllie, to whose work the writer would refer anyone seeking further information on the subject. Here it is sufficient to state that "lalling" is essentially "baby-speech," being presented in the speech of every child at its earliest stage of talking. It is a *morbid* phenomenon only when it persists for an unusually long time, as is the case in all children who are backward in mental development. Essentially it is a defect not in phonation, but in the *education of the oral articulatory mechanism*. The speech is (as Wyllie says) "scamped," the difficult articulatory movements being slurred over, so that the word may be made easy of pronunciation, as in the speech of babies, the easier consonants being substituted for the more difficult ones.

In treating such cases, if the patient be an intelligent adult, the instruction should of course be given to him or herself; when it is a child, the parents must be taught how to remedy the defect. The first essential is to find out upon what particular letters the patient "lalls." For this purpose the patient should be made to pronounce after his teacher (1) each of the *vowels* given simply; (2) each of the *consonants*; but these must be given by the teacher in three different ways, the pupil attempting to imitate him exactly, namely, (a) as *initial*, (b) as *terminal*, (c) as *mid letter*. The whole "Physiological Alphabet" must be gone through so that every defective letter may be detected by the teacher and noted down. Thus, for example, the letter P should be given to the pupil as Papa, apap, appa; similarly M as Mama, amam, amma, and so on.

The whole alphabet having been gone through in this fashion, the defectively pronounced letters being underlined, the teacher can afterwards concentrate his pupil's attention upon those on which he "lalls," and teach him, by demonstration in his own articulatory mechanism, how they ought to be pronounced. If the patient be intelligent and of sufficient age, careful instruction in this fashion will often effect a wonderfully rapid cure.

ON CEDEMATOUS AND ERYSIPELATOUS ANTHRAX.

By JOHN HENRY BELL, M.D.,

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OUR knowledge of the various forms of anthrax as they affect man in this country has been very slowly acquired. The external form known as "malignant pustule," or rather cutaneous anthrax, was not observed in England till the year 1854 (published in 1863). The pulmonary form, although it was known in the Bradford worsted district as "woolsorters' disease" from the year 1846, was not recognised as anthrax till thirty-three years afterwards—1879. During these years cutaneous anthrax must have been seen frequently, but it was not diagnosed as anthrax till 1880; neither were such cases previously attributed to infection from wool. Other varieties of external anthrax, as the *edème malin* of Bourgeois, or malignant anthrax oedema, which I prefer to call cedematous anthrax and erysipelatoous anthrax, in accordance with the symptoms, although not uncommon in some countries of Europe, do not appear to have been observed in England previous to the cases now recorded.

Erysipelatoous anthrax has been so called solely on account of its resemblance to erysipelas, and not that it is a compound of erysipelas and anthrax.

It is, perhaps, appropriate that these varieties of external

anthrax and the pulmonary form of internal anthrax should have been first detected in the Bradford worsted district, where the disease as it affects both man and animals is more prevalent than in any other part of Great Britain. Primary intestinal anthrax has not yet been met with in England; but knowing that such cases are not infrequent in various parts of Europe, it is possible that they do occur here occasionally and hitherto have escaped detection.

The first cases of *adéma malin* were noticed by Bourgeois in Provence, France, in 1834, and his observations were published in 1843. He wrote afterwards a very complete description of the disease in his book on *La Pustule Maligne et l'Edème Malin* (1861). All subsequent writers on anthrax have been almost entirely indebted to this author for their statements respecting malignant anthrax oedema, none have written from their own observations. This form of anthrax is rare. Dr. Nicholai states that out of 300 cases of external inoculation he had only seen two cases of this kind.

CAUSE.

How the virus becomes introduced locally when no point of inoculation can be seen is questionable; it may pass through natural openings of the skin or mucous membrane, and this may determine the production of a diffuse inflammation rather than the ordinary external lesion such as occurs when introduced through an abrasion or wound.

SYMPTOMS.

Bourgeois says, "It begins as a pale swelling, soft and without pain. It is only after several days and marked development that vesicles and eschar form, notably on the eyelids, but at the onset the skin is smooth and has no trace of pimple."

General symptoms are of a negative character. The freedom from pain and distress is remarkable. The pulse may not be much over natural and the temperature not more than normal.

Local symptoms are the extensive oedema which may extend from the scalp to the pubes, with much swelling. In the first case seen by Bourgeois in 1834 the lips of the patient protruded like the snout of a pig. In slight cases there is no redness, vesication, or eschar; in severer cases much redness, late vesication and eschar, or gangrenous appearance of the skin. In none has there been any pain, only tightness from stretching of the skin.

DIAGNOSIS.

The course of erysipelatoous anthrax is on lines so nearly parallel with ordinary erysipelas that the differences might easily be overlooked. The late Dr. Fagge, in his work on *Medicine*, states that "Zülzer speaks of the cedematous form of charbon as being sometimes mistaken for erysipelas." When a person has been exposed to contagion and is found to have considerable acute swelling of any part, especially of an exposed part of the body, unlike ordinary diseases, and without much pain, distress, or fever, this form of anthrax may be suspected. It may be distinguished from acute emphysematous gangrene and its congeners by the absence of injury, pain, emphysema, much fever, and constitutional disturbance. The only proof, however, is the finding of the bacillus by cultures or physiological tests with blood or serum taken from the body. In a slight case with oedema only it is probable that a few minims of blood taken from this part and injected under the skin of a white mouse would cause death from anthrax. Cultures are not so certain a test for anthrax as physiological experiments, but in doubtful cases they are more to be depended on for determining the kind of bacillus.

PROGNOSIS.

Every systematic writer on anthrax copies from Bourgeois's work. He states that *adéma malin* is infinitely more dangerous than the pustule. Up to 1859 all the cases observed had terminated fatally. In 1861 he excepted some cases which had affected the eyelids. Of the 6 cases here recorded—if all may be taken as of this nature—it will be noticed that 3 were fatal.

Case 1.—(Edematous Anthrax.)

Dr. Rabagliati has kindly allowed me to copy from his diary the following notes of the illness of a gentleman, a wool-comber, who had been exposed to the infection of anthrax in the ordinary round of his business.

C. H., aged 48 years, on June 15th, 1898, complained that his upper lip was swollen, numb, and stiff; there was also some oedema of the cheek towards the right eye. The pulse was 60, which was natural to him. The ailment began on the previous afternoon. He was visited again during the evening, when swelling of the upper lip was less, but the lower lip felt numb and stiff, and about ten minutes afterwards it swelled suddenly to a great size, which was more marked towards the left side of the face. The pulse was 60 and the temperature 98° F.

Third Day.—The swelling was reduced and he felt well. During the afternoon he was seen again, when the diagnosis was arrived at that he had the oedematous form of anthrax. On examining his mouth a small sore on the gum was found over the root of the upper right lateral incisor tooth. This had suppurated slightly from time to time for some months. The pulse was 58, the temperature 98.8°.

Fourth Day.—In the morning he was much better; the pulse was 56, and the temperature 99.4°. During the evening he had felt chilly once or twice. At 10 P.M., when seen again, he had some numbness, swelling, and stiffness on the dorsum of the penis. On the following morning, that is, the fifth day, the oedema was less; the pulse was 48, and the temperature 98°. He felt anxious, was restless, and did not want to be left alone. The hands and feet were cold, with cold perspiration on face. On the sixth day he was better; the pulse was 48, and the temperature 98.4°. His progress afterwards was favourable. Blood from oedematous parts was not examined.

Case 2.—Erysipelatous Anthrax.

R. R., aged 30, an overlooker of woolsorters, where camels' hair, Persian, and East Indian wools were used, called to see me in the afternoon of November 4th, 1898. His right lower eyelid was swollen as if from erysipelas, but without redness of the skin. It had been noticed the previous evening, and the swelling had increased since. On careful examination with a 2½ inch convex lens no papule or abraded spot could be found. The pulse was 88, temperature 99.8°. He had no pain, and did not feel ill.

Third Day.—When visited in the morning he stated that he had passed a fairly good night. The right eyelids were completely closed; the oedema, without any redness of surface, had extended to 2 inches above the right eyebrow, to the inner end of the left eyebrow, and to within one inch of the right ear. On the lower right eyelid three-quarters of an inch below and outwards from the inner canthus, the skin was of a slightly darker colour, as if it might vesiculate. The tongue was clean, and he had vomited twice after breakfast, when he felt slightly cold, but had no chill. The pulse was 106, and the temperature 103.4°. At 8 P.M., the oedema had extended in all directions: on the right side to behind the ear, but did not involve the ear itself. There were two or three vesicles below and external to the inner canthus, of a light brown colour, but there was no grey or dark discoloration. The pulse was 116, and the temperature 103.2°.

Fourth Day.—11 A.M. Pulse 104; temperature, 102°. He had slept moderately, had no pain in the head, and his mind was clear. The swelling had extended; the right submaxillary glands were painful, and the left eyelids half closed. At 9 P.M. Pulse 100; temperature 101.3°. He had slept at times during the day, and had no pain. He had vomited at 8 P.M.

Fifth Day.—11 A.M. He had slept fairly well, had no pain except from tension of the skin. The tongue was clean, the appetite moderate, and there was no vomiting. The bowels had been moved. The urine was dark coloured. Pulse 92; temperature 100.8°; respirations 20.

Sixth Day.—Pulse 74, temperature 100.4°. The inflammation and swelling were not extending; the eyelids were very hard. Incisions were made to let out the serum in the hope of preventing sloughing.

Seventh Day.—Pulse 70, temperature 100°. He had slept well, and felt better; the appetite was moderate. There was some superficial sloughing of the lower eyelid, and much chemosis of conjunctiva. This was incised, and much serum discharged. Progress continued favourable. Clear serum taken on the fourth day was inoculated, with a negative result.

Case 3.—Erysipelatous Anthrax.

F. W., aged 35, woolsorter, had the best of health till he returned home on December 5th, 1898, after sorting Persian wool. He was seen an hour afterwards by Dr. Jackson, of Denholme, when he complained of his left arm being stiff and swollen. The skin over the deltoid appeared as if it had been rubbed or scratched with the fingernails about the extent of two fingerbreadths; the redness and swelling extended downwards to the elbow and upwards over the shoulder, but not across the chest. There was no abrasion or vesication of the skin. On the following day the swelling had extended in all directions; his temperature was below normal, he had no pain, no cough, and there was no eschar, although the skin over the deltoid was of a darker colour than natural. On the third day the temperature was lower, he appeared to be sinking, and died forty-eight hours after leaving his work.

Post-mortem Examination.—At the examination of the body twenty-eight hours after death the skin over the upper parts of the body was of a dark colour, and also the finger nails. There was some fluid in the right side of the chest. Serum taken from the arm and chest contained the bacillus anthracis.

Case 4.

E. S., aged 60, was a jobber in a wool-carding room. On December 31st, 1898, he got up as usual at 6 A.M., but felt well. Three hours afterwards the right side of his neck was noticed to be swollen. He was about all the day, and slept well the following night. On Monday morning there was more swelling, some redness, no pain, and no shivering. The appetite was moderate. He was seen by Dr. Taylor, of West Bowling, at 3 P.M.; the pulse was 100, full and strong, and the temperature normal. On Tuesday morning he felt fairly well, but weak when he sat up; the pulse was small and scarcely perceptible. The temperature in the axilla was below normal, he perspired freely. At 3 P.M. the respirations were 24, the pulse 120, and the temperature in the axilla was 95.6° F., in the mouth 94.8°, and in the rectum 100° F. The redness had extended to the right shoulder and side of the chest, the oedema several inches beyond this and on the left side half way between the sternum and axilla. At 9 P.M. the temperature in the axilla was 96° F., in the mouth 95° F., and in the rectum 100° F.; the respirations were 40 and the pulse 120. There was no cough, and no pain except in the feet. Death occurred four hours afterwards.

Post-mortem Examination.—At the examination of the body forty-four hours after death, rigidity was marked. There was much swelling and dark purple discoloration of the face, neck, and chest, with general oedema all over the body and limbs. The epidermis was loose and detached over the chest and right side; there were also large blebs on the left side of the neck, the loins, and the back, which were filled with clear serum. The fingers were dark-coloured and the nails black. The pleural and pericardial fluids were not much in excess. There were several hæmorrhagic patches under the mucous membrane of the intestines, mostly on the lower part of the ileum and also in the mesentery. Other organs were apparently normal. The blood was fluid. Anthrax bacilli were very numerous in fluids taken from the body.

Case 5.—Erysipelatous Anthrax.

On March 12th, 1899, I visited with Dr. Thomas for Dr. March, Bradford, J. G., aged 29, a willer of low class foreign wools. On March 7th he was "out of sorts," and did not go to work.

On the second day a small pimple was noticed at the outer canthus of his right eyelids, which were both swollen.

On the third day the right eyelids were much swollen, and the upper was red.

On the fourth day the swelling had extended; he could scarcely open the eye, and the right submaxillary glands were swollen and tender.

On the fifth day there was vesication of the right eyelids, the neck, right side of the nose, and the left eyelids were swollen and inflamed.

On the sixth day the right upper eyelid was greatly swollen, red and hard, and had two blebs the size of kidney beans; there was one also on the lower lid, and another at the outer canthus. These contained a clear, gelatinous, straw-coloured serum. The pulse was 88, and the temperature 100.5°.

On the seventh day the swelling had increased. Neither eye could be opened, the right ear was doubled on itself, the mucous membrane of the cheek was much swollen, the submaxillary glands and the anterior aspect of the neck were greatly swollen, the scalp pitted on pressure, and he was slightly delirious. The pulse was 76 and the temperature 101.8°.

Fig. 1.—Photograph of J. G. taken on the seventh day.

Eight Day.—He had slept four hours. There were other vesicles on cheek; the swelling was very tense; the tumour in the mouth from oedema was subsiding; the left eye could be opened; the occiput was much swollen. The pulse was 88 and the temperature 101.8°.

Ninth Day.—The brawny swelling of the face, lips, and in the mouth was less, and he had taken nourishment better. The pulse was 88 and the temperature 102.8°.

Tenth Day.—The swelling was going down, the blebs were dry; there were black eschars on the right lower eyelid, much fluid from the conjunctiva, and many small vesicles on the cheeks. He could now close his mouth and was able to drink. The pulse was 78 and the temperature 100.6°.

Eleventh Day.—Pulse 72, temperature 98.9°. He continued to make good progress to recovery.

Serum taken on the sixth day from some of the blebs for cultivation on gelatine yielded positive results.

Case 6.—*Erysipelatous Anthrax.*

J. W., aged 27, a willer of Persian wool, was at work on April 28th, 1899, when he noticed a small pimple on the front aspect of his left shoulder; it did not alter much for several days following. On May 1st he had some tinny salmon, and did not feel well afterwards. Next day he vomited and was poorly, felt cold, and could not sleep; the spot on the shoulder was itchy and more swollen.

On the third day it was worse and blistered, but not painful. He was seen by Dr. Angus, of Bingley. The pulse was very feeble, and temperature 100° F.

On the fourth day in the morning he stated that he had passed a good night, had no pain or appreciation of his serious condition, but felt as if he could get up and go to his work. He had a fresh and healthy complexion, without any distressful look. The pulse could not be counted at the wrists; over the heart it was 118; the temperature in the mouth was 99.5°, in the rectum 101.4°. On the anterior aspect of the left shoulder was an irregular-shaped blister about 2 inches in diameter, which partly exposed a raw surface. The skin around this—6 inches in one direction and 5 inches in another—was of a flesh-red colour, which did not disappear on pressure. Beyond this the skin was of a bright red rose colour, which disappeared on pressure. The oedema extended around the shoulder over the left arm, across the neck to the right side of the face, the submaxillary glands and side of the chest, much more on the right side of the body than on the left, probably from not being able to lie on his left side. The glands in the axilla and neck were enlarged, but not painful on pressure. During the afternoon, when Dr. Angus again visited him, he was dressed and downstairs, sitting in front of the fire, although he was pulseless at the wrists. At 9 P.M. he had slept well since the doctor's previous visit, and did not feel ill; the tongue was moist, the appetite moderate, and there was no cough. The pulse over the heart was 107; the temperature in the mouth was 98.6°, and in the rectum 99.4°. The respirations were 22. The mind was clear; but the heart sounds were more feeble. Much clear straw-coloured serum flowed from the vesicles. There was no apparent eschar. He died at 11 P.M. on May 5th.

Examination of Body Thirty-Six Hours after Death.—Rigidity of the limbs was well-marked. The discoloration of decomposition on all parts of the body was such as is more usually seen a fortnight after death. There was much dark purple discoloration of the skin over the anterior part of the neck and the upper part of the chest with much oedema and emphysema. The anterior aspect of the left shoulder was stripped of epidermis as if it had been blistered, and the exposed skin was of a flesh-red colour excepting an irregular patch over and 3 inches across in different directions, which was black and gangrenous. The oedema extended all over the chest and abdomen; the superficial veins of the body and limbs were sharply defined, and were of a dark purple colour; the ends of the fingers were a dark-blue colour; the toes were natural. On section of the skin over the chest much clear fluid escaped. Air was present in the cellular tissue beneath the sternum; the left lung was extensively adherent to the side (old). The right side of the chest contained about a pint of serum. Within the external layer of the pericardium were several infarcts of blood varying from one-third of an inch to 1 inch across. The heart appeared to be natural; it contained fluid blood, and the internal surface was deeply stained; the aortic and pulmonary valves were of a dark chocolate colour; the lining of the large vessels was of a bright cherry colour. Several patches of extravasated blood were present beneath the external coat of the stomach, the bowels, and the mesentery; one of these on the ileum was 2½ inches in length, and extended all round the bowels. The spleen was soft. The liver and kidneys were congested owing to the fluid state of the blood. The brain appeared to be free from disease.

Capillary tubes charged with serum taken from the body were sent for examination to a well-known clinical laboratory, the report from which did not confirm the diagnosis of anthrax (examination not early enough). Cultivations on gelatine and agar-agar with serum from similarly charged tubes were tried, with a negative result. The contents of three other tubes were given to a guinea-pig, which was found dead seventy-three hours afterwards. In fluids from this, anthrax bacilli were very abundant.

TREATMENT.

It is evident that the treatment generally adopted in localised anthrax lesions by excision, cautery, or caustics is not suitable for the diffused inflammatory form. In Case 2, which recovered, chinolol was given by the mouth (gr. i every three hours), by the lungs (nebulizer, 4 per cent.), and by daily injections into the cellular tissue at several points. When the skin of the eyelids was much swollen and hard, incisions were made to relieve tension and prevent sloughing; afterwards chinolol lotion was applied. Perhaps the most promising method of treatment is the intravenous injection of non-toxic germicides.

A CASE OF MULTIPLE MALIGNANT PUSTULES
(ANTHRAX).

By R. LAW FORD KNAGGS, M.C., F.R.C.S.,
Assistant Surgeon to the Leeds General Infirmary.

MALIGNANT pustule, or external anthrax, is nearly always single. The following case, in which three, and perhaps four, were present, is therefore of special interest. The careful record of the facts is due to Mr. F. Talbot, M.B., the acting casualty officer.

The treatment by excision of the pustule is nearly always

followed by rapid disappearance of all serious symptoms and by prompt convalescence. This result may be counted upon if the bacilli have not penetrated the lymphatics and been carried beyond the local disease. Infection of the resulting wound by bacilli from the sore which is being excised cannot be a really serious danger. The writer has seen many pustules excised, but never once any recurrence in the wounds.

G. A., aged 20, a groom, was sent up to the Leeds General Infirmary on September 7th, 1900, by a medical man because of the suspicious appearance of four sores upon his forearms. The sores had a very strong resemblance to anthrax pustules, but there were no vesicles around the central eschars, and the surrounding zones of inflammation were very limited. The patient was not suffering from any marked constitutional disturbance, though he stated he had felt somewhat ill since the appearance of the first sore, and one day his temperature had been 104°. The conditions present on the 7th were not sufficiently clear to justify a certain diagnosis, but the man was warned and told to present himself daily for inspection. The next day (September 8th) the largest of the sores had put on a very serious aspect, and he was at once admitted. He then gave the following information, which he had withheld on September 7th, although he knew that anthrax was suspected.

On August 30th he took part in a *post-mortem* examination on a cow said to have died of anthrax. He received a small wound near the web of the thumb of the left hand on its posterior surface. This apparently healed. On September 3rd a small pimple appeared just below the bend of the left elbow. This gradually grew to the condition presently to be described. On September 6th another pimple appeared on the ulnar side of the right forearm, and on September 7th another at the bend of the right elbow. When admitted on September 8th the sores presented the following appearances. That at the bend of the left elbow was an ulcer 1 inch in diameter, somewhat circular in shape, and with a base composed of dark-brown or black sloughing tissue. Surrounding the ulcer was a ring of yellow swollen and oedematous skin upon which were several large and irregular blisters. There was a considerable area of surrounding cellulitis, and the lymphatic trunks upon the inner side of the arm were much inflamed. The epitrochlear and axillary glands were enlarged. The sore on the ulnar side of the right forearm was about the size of a sixpence. It showed a central black eschar and a small zone of surrounding inflammation. There were no very evident vesicles. That at the bend of the right elbow was smaller. Its centre was yellow and had not yet become an eschar. It was not unlike a vaccination pock about the eighth day. Here also the surrounding inflammatory zone was very slight. The original wound on the left hand looked like a small copy of the second sore, and as if the disease at that centre had aborted. The other three sores were actively progressing. Though the patient's temperature was 102.4°, his general condition was good. Anthrax bacilli were demonstrated in the exudation taken from the largest sore.

The same night the patient was anaesthetised, and all four sores were widely excised by Mr. Talbot. All the tissues down to the deep fascia were removed, and pure carbolic acid was applied to the wounds. The temperature at once began to fall, and was normal on the evening of September 10th. The wounds quickly healed, the large one being assisted by skin grafts. The patient left the hospital on September 29th.

A CASE OF ANTHRAX WITH EXTENSIVE
MENINGEAL HÆMORRHAGE.

By JOSEPH C. STURDY, L.R.C.P. & S. EDIN.,
Bradford.

F. B., aged 33, a wooll sorter, while at work on March 5th, was seized with shivering, pains all over, and slight nausea. On the following day the temperature was 102°, and pulse 110. The tongue was furred; breathing was normal; and the pains in the limbs were as before. He appeared to be suffering from influenza. On March 7th the temperature was 99°, and the pulse 98. The pains were relieved, and there were no chest symptoms.

On March 8th the patient found "a lump" on his neck. When visited his temperature was 99°, and the pulse 108, and very weak. The swelling was on the right side of the neck, 3 inches above the clavicle, and 1 inch behind the outer border of the sterno-cleido-mastoid muscle. It was the size of a sixpence, and raised ½ inch above the surrounding skin. The edge was vesicular, and of a greyish colour. There was no inflammatory area round it, nor was there any induration or oedema in the tissues. The glands were not enlarged. Recognising that it was a case of anthrax, with the help of Dr. Sergeant the swelling was excised, leaving a wound 2½ by 1½ inches; this was swabbed with a spirituous solution of carbolic acid (1 in 10), some of which was also injected into the surrounding tissues.

On the following morning (March 9th) the patient said that he had passed a good night, and was free from pain. The temperature was 99°, and the pulse 98. About 1 P.M. he suddenly became blind, complained of pain in his head, vomited, and in half an hour was unconscious and very restless. At 5.30 P.M. the temperature in the axilla was 99.7°; in the rectum 102.2°. He was so violent—requiring two persons on