

middle ear. A few drops of a two- to four-per-cent. solution blown into the Eustachian tube by means of a catheter were in most cases sufficient to stop the pain for several hours. Kiesselbach (*Monatsschrift f. Ohrenheilkunde*, xxiii., 9, 1889) had good success from insufflation of a few drops of a four-per-cent. solution into the Eustachian tube in cases of subjective ear noises. The insufflations were made at intervals of from three to five days, the strength of the solution being increased to ten per cent. The most various noises disappeared entirely; most cases improved.

General Surgery.—The use of cocaine in general surgery is very extended, and in minor operations has displaced general anesthetics and other methods of local anesthesia. It is injected under the skin or into the deeper layers of the skin at the site of the operation by means of the hypodermic syringe. Careful distribution over the field of operation is necessary for full effect. Corning's method of "incarceration" is an important improvement on the simple injection (J. Leonard Corning: "On the Prolongation of the Anæsthetic Effects of the Hydrochlorate of Cocaine when Subcutaneously Injected—An Experimental Study," *New York Medical Journal*, September 19th, 1885, and "Local Anæsthesia in General Medicine and Surgery," in book form, Appleton & Co., 1886). A short time is given to the circulation to distribute the drug over the field of operation, then exsanguination of the limb and application of a tourniquet (especially devised apparatus on other parts) keep the solution in place. By this way of proceeding, the anæsthetic effect can be prolonged indefinitely, while absorption into the general circulation and poisonous effects are prevented.

At present extirpation of small tumors, extraction of foreign bodies, amputations of fingers and toes, operation for phimosis, operations for ingrown nail, incision of abscesses and furuncles, are performed under cocaine anesthesia. Pernice (*Deutsche med. Wochenschrift*, 1890, 14) reports more than a thousand cases operated in the Polyclinic at Halle, where one-per-cent. solutions were used, which were always found sufficient. Not more than 0.01-0.02 gm. was injected, and thus accidents could with certainty be avoided.

In genito-urinary surgery cocaine is extensively used, not only for external and internal urethrotomy, but also for operations in the bladder (litholapaxy). As the unbroken epithelium of the bladder has hardly any power of absorbing, enormous quantities have sometimes been used (1.00-5.00 gm.!). However, genito-urinary surgery is especially rich in accidental poisoning, the assumption of an unabraded epithelium not always being correct.

Dentistry.—To make extraction of teeth painless it is not sufficient to brush the solution on the gums, as this does not make the alveolus anæsthetic. Even injection between gum and alveolus in one place only will frequently fail. All those who report successful anesthesia (George Viau: "De l'Anesthésie buccale," Paris, 1886; Bleichsteiner, Congress of Dentistry, Paris) concur in the recommendation to inject the solution under the gum in several places on the inside and outside of the alveolus. A five-per-cent. solution is sufficient, and not more than 0.05 gm. cocaine should be used. Even then one must expect to encounter a larger number of cases in which constitutional symptoms occur than are observed in other branches of surgery. Schlenker ("Ueber Cocain als locales Anaestheticum," *Tageblatt der 61. Vers. deutscher Naturf. und Aerzte*, Köln, 1889) had three per cent. of graver and five per cent. of minor cases of poisoning. Bleichsteiner had collapse in five to six per cent. of his cases.

Gynecology.—Apart from the use in minor operations on the vulva, vagina, and the cervix, cocaine is especially valuable in the treatment of vomiting in pregnancy, vaginismus, and sore nipples. In cases of vomiting in pregnancy it has been found successful where all other medication failed, whether administered by the stomach, hypodermically, or by application to the os or cervical canal (Weiss: *Prager med. Wochenschr.*, 1884, No. 51—

0.004 gm. internally every half-hour; Phillips: *London Lancet*, November 26th, 1887). It is scarcely used any more at present in obstetrics; in the first enthusiasm it was recommended to alleviate pain in labor.

Dermatology.—Cocaine does not have any effect if applied to the unbroken epithelium. If the latter is macerated or wanting, solutions or ointments can be used to combat itching as in vesicular eczema, especially in the itching eczema of the genitals, in painful ulcers, and after cauterizing. In different operations on the skin, and before cauterizing, the application is the same as described under the heading of General Surgery. Touton reports painless treatment by electrolysis of warts or moles, if a few drops of a five-per-cent. solution are injected under the little tumor (which fact the writer can confirm). It is of theoretical interest that cocaine, like other substances, can be driven into the skin by the electrical current if applied to the positive pole—cataphoretic action of the galvanic current (Wagner: "Ueber eine neue Methode Haut-Anaesthetie durch Cocain zu erzeugen," *Zeitschr. für Therapie*, 1886, No. 6). The anesthesia thus engendered may be used for superficial operations.

In general medicine much has been expected from the stimulating powers of cocaine upon the physical functions. However, it does not seem to be extensively used for this purpose, perhaps from exaggerated fear of the cocaine habit. From the experiments of Freud, Hammond, and others it is apparent that it has a decidedly stimulating power upon the psychical faculties, and some writers report very good results in neurasthenic patients and in melancholic depression (0.02-0.3 gm. internally several times a day). According to these observers (Freud: "Bemerkungen über Cocainsucht und Cocainfurcht," *Wiener med. Wochenschrift*, xxxvii., No. 28, 1887) the cocaine habit is not to be feared, as persons, unless they are addicted to the opium habit, can discontinue the use of cocaine without any symptoms therefrom. Preparations of coca in the form of coca wine are extensively advertised and used as a nerve stimulant.

In whooping-cough applications of two- to five-per-cent. solutions to the tonsils, pharynx, and epiglottis have been used with good result (Schuier, *Arch. für Kinderheilkunde*). Various neuralgias and the shooting pains in locomotor ataxia are a field for the subcutaneous application of cocaine. In tabs, 0.02-0.03 gm. twice a day is reported to have succeeded in cases in which morphine did not have the desired effect. Cocaine has also been recommended in seasickness; however, with little success.

Opium Habit.—The recommendation (Freud: *Centralblatt für Therapie*, July, 1884) to use cocaine in the cure of the opium habit did not meet with general approval, on account of the danger of making the subjects of the opium habit victims of the cocaine habit in addition. As Freud ("Bemerkungen über Cocainsucht und Cocainfurcht," *Wien. med. Woch.*, 1887, No. 28) believes, cocaine is a very valuable agent to combat the craving for morphine and the collapse incidental to the disuse, provided the physician absolutely controls the administration. Obersteiner considers the use of cocaine admissible if no morphine at all is given. He recommends to administer it only internally, the first dose twenty-four to forty-eight hours after the last dose of morphine, giving about 0.05-0.1 gm. several times a day, and not more than 0.5 gm. per day, gradually diminishing the quantity and stopping the administration on the fifth or sixth day.

Accidental Poisoning.—It is not surprising that a drug which came into such rapid and general use in almost all branches of medicine and surgery should have given rise to many and even fatal accidents, partly due to lack of acquaintance with the drug, and partly due to recklessness. The history of cocaine poisoning has already developed quite a literature. Its more judicious use in recent years has greatly reduced the frequency of such accidents. Cases of slight poisoning, which are the commoner ones, offer the following objective symptoms:

Pallor, cold perspiration, frequent pulse, dilated pupils; subjectively the patients complain of dryness of the throat and the lips, a feeling of heaviness in the limbs, weakness, or even vertigo. This condition does not last long, and after a short time (one-half to one hour) complete well-being sets in, even if no restoratives are used. In another class of more serious accidents great mental excitement, with talkativeness, hallucinations, and even delirium, may be present. On the other hand, conditions of syncope and collapse may prevail. In the gravest cases painful dyspnoic breathing, clonic and tonic convulsions occur, which may cause death by tetanus of the respiratory muscles. Or death may result from paralysis of respiration and heart without preceding convulsions. Dr. Paul Mannheim, under the guidance of Leyden, has made a thorough compilation of the accidents hitherto reported in medical literature ("Ueber das Cocain und seine Gefahren in physiologischer, toxicologischer und therapeutischer Beziehung," *Zeitschrift für klinische Medizin*, xviii., 3 and 4, p. 380, 1891). The discussion in the Société de Chirurgie de Paris of a fatal case reported by Dr. Paul Berger, is also of great interest and rich in information ("Empoisonnement mortel produit par l'injection d'une Solution de Chlorhydrate de Cocaine dans la tunique vaginale à la suite de la ponction d'une hydrocèle," *Bulletin et Mémoires de la Soc. de Chir. de Paris*, 1889, pp. 751, 757, 761, 790).

Mannheim has collected ninety-nine cases from the literature in which the doses used, the symptoms, etc., were stated with sufficient accuracy, and the following account is based upon these cases. The statement frequently made that weak and nervous women are more inclined to constitutional symptoms cannot be accepted; sex does not show any influence. Idiosyncrasy cannot be proven to play a part (the writer fully concurs in this opinion). Although idiosyncrasy against alkaloids certainly exists as a rare exception, it will not do to assume such peculiarity in every case in which a quantity harmless to one individual, produces constitutional symptoms in another. There are other circumstances that should be taken into consideration; for instance, the velocity with which a given amount is thrown into the general circulation. The same quantity in a more concentrated solution will be more quickly absorbed than if dissolved in more water; a tissue richer in blood-vessels will absorb faster than a less vascularized one, etc. For similar reasons it may be that constitutional symptoms occur with relative frequency in operations on the head, which fact has been especially emphasized by Wölfler ("Zur toxischen Wirkung des Cocain," *Wien. med. Wochenschr.*, xxix., 18, 1889) and explained by the nearness of the brain. The sitting posture has been accused as especially aiding the anemia of the brain, supposed to be the chief cause of the weakness and vertigo in the minor cases. Out of the 99 cases tabulated by Mannheim, cocaine was administered hypodermically in 51, instilled in the eye in 9, in the ear in 2, brushed on the mucous membrane of the nose in 5. Sometimes very small doses produced graver symptoms, sometimes very large doses were followed by very slight ones. The time of appearance of the symptoms varies, being five to ten minutes on an average; sometimes they appeared immediately after administration or after a few seconds, sometimes only after one-fourth or even one-half hour. In the following the symptoms of poisoning are given as collected by Mannheim from the various cases. (The seeming contradiction in the symptoms is not to be wondered at, if it is taken into consideration that cocaine is a poison with first stimulating and afterward paralyzing properties, and that according to quantity or velocity of absorption the first or the second will prevail.)

General Symptoms.—The patients become sleepy and get into a soporose condition; they almost lose consciousness and faculty to articulate, or they fall within a few minutes into a very deep sleep of comatose character. Severe collapse has been observed, preceded by weakness, with complete loss of consciousness of long duration and with reduced respiration. In other cases the

patients become very restless and excited, seem dizzy, cry and laugh alternately, gesticulate, and are very talkative, not heeding any questions put to them; incessantly change their position, stand up, sit down; their gait becomes unsteady, like that of a drunken person. This condition grows into intoxication, or a feeling of impending death. There may be sleeplessness, lasting from thirty to forty hours; afterward complete forgetfulness of what has happened.

Central Nervous System.—In mild cases reflexes are increased; there are cerebral irritation and delirium, lasting as much as an hour, and hallucinations. In severe cases there are epileptiform attacks, with general clonic convulsions, lasting even five hours, tetanus, opisthotonus, death.

Peripheral Nerves.—Sensibility diminished. Complaints of loss of sensation over the whole body or on single parts, limbs, or pharynx. Sometimes only numbness, sometimes complete anesthesia. Feeling of intense coldness in the anæsthetic parts. Various paresthesias. On the part of motor nerves twitching of single muscles (or, as already mentioned, general convulsions), in other cases heaviness or tired feeling in the limbs, sometimes aggravated to apparent paresis. Gait staggering or complete inability to walk.

Eye.—Pupils dilated, sometimes very contracted; reacting in some cases, in others motionless. Some patients complain of darkness before the eyes, others notice diminished acuteness of vision, complain of mist before the eyes; in some instances complete amaurosis (transient). One lady recovered vision only after four hours.

Other Special Senses.—Buzzing in the ears, various disturbances of smell and taste.

Respiration.—Short, whistling, laboring. Paroxysms of dyspnoea. On the contrary, the frequency can be diminished (even to nine respirations in the minute) and may cease, so that death occurs by asphyxia. Sometimes Cheyne-Stokes respiration has been observed.

Circulation.—Pulse very accelerated, often very weak, filiform, irregular, at last hardly or not at all perceptible. In other cases, pulse less frequent. Diuresis increased according to some writers, diminished and even suppressed according to others.

Organs of Digestion.—Numbness of the throat, as-tringed sensation and dryness in the pharynx, dysphagia. Burning pain in mouth and stomach (even after hypodermic administration). Pain in intestines. Rectal and vesical tenesmus.

Cause of Death.—Paralysis of respiratory and vasomotor centres and heart, whereas in other cases death results from tetanus of respiratory muscles.

Autopsy showed, in the few cases examined, intense hyperemia of the brain and of the inner organs.

Fatal Dose.—In five of the fatal cases the dose was larger than 1 gm., whereas only one patient who had been given 1.25 gm. recovered. From this Mannheim concludes that 1 gm. is to be considered the fatal dose.

Of the 99 cases thus compiled, 9 were fatal. Besides, there are 100 cases in literature in which no symptoms are mentioned. Of Mattison's 108 cases, 58 are included in Mannheim's table, whereas 50 are not. This makes altogether 250 cases with 13 fatal results, so that of the accidents reported five per cent. proved fatal. (Considering that most of the graver and fatal cases are reported, while the much more frequent minor accidents do not come to general cognizance, the figure five per cent. is certainly too high.)

Treatment of Cocaine Poisoning.—In the minor cases, in which weakness and dizziness prevail, horizontal position of the patient and administration of stimulants, like brandy, coffee, ether, are the reasonable measures to be taken. Inhalation of a few drops of amyl nitrite has been recommended, and is the measure generally adopted to combat the supposed anemia of the brain. For the severe cases in which convulsions occur, Mosso, from his experiments on dogs, comes to the following conclusion: "If it were necessary to assist a human being poisoned with cocaine, one would have immediately to resort to

ether or chloroform to prevent tetanus of the respiratory muscles, which is the most frequent and dangerous cause of death. After the first grave and imminent danger has passed, chloral can be given. If respiration stops, artificial respiration must be resorted to."

DOSE.—Internally 0.02 to 0.05 gm. several times a day may be considered a safe dose, and even 0.1 gm. may be given. For hypodermic use in operations it is advisable to keep under the 0.05 gm. limit. Weak solutions of one per cent. and two per cent. should be used, well distributed over the field of operation. For spraying (nose, throat) weak solutions (two per cent.) should be used in known quantity. For operations in nose, pharynx, and larynx, brushing with strong solutions cannot be avoided, but in these cases the danger is obviously less because the quantities used are small. Careful watching of the patient and gradual administration in all cases will increase the safety of continued administration.

COCAINE HABIT.—Most subjects of the cocaine habit are victims of the opium habit who have taken cocaine for the purpose of curing themselves, have not succeeded in their efforts, and have consequently become addicted to both drugs. It is therefore not easy to state the symptoms of the cocaine habit pure and simple. Luff (London *Lancet*, September, 1889) tells of a man who used 0.25 gm. daily during three years for nasal catarrh, and who in consequence was very much reduced physically, mentally, and morally. He became unsociable, incapable of attending to his business, because unable to come to any decision. Palpitations of the heart and obstinate constipation were also among the symptoms from which he suffered. Bauer (New York *Medical Record*, November, 1885) tells of a man who replaced the use of alcohol by daily injection of 0.67 gm. cocaine. He became very weak, lost all appetite, had attacks of delirium, and ultimately fell into complete physical and mental decay.

From all observation it appears that rapid falling off in flesh is one of the most prominent somatic symptoms of the cocaine habit. Erlenmeyer (*Deutsche med. Zeitung*, 1886, p. 483) reports a falling off of twenty to thirty per cent. within a few weeks, without diminution of food and with no existing catarrh of the stomach. He lays great stress on the respiratory and vaso-motor disturbances caused by the blood-vessel-paralyzing properties of cocaine: frequent pulse, relaxation of arterial system, profuse perspiration, syncope. The psychical symptoms are very marked and characteristic, and in well-developed cases offer the clinical picture of hallucinatory paranoia. They consist, according to Obersteiner, chiefly of feelings of fright caused by hallucinations, especially in the visual and sensory spheres. Either terrible apparitions are seen or great hordes of small animals. These latter hallucinations are most likely based on itching paresthesias of the skin, giving to the patient the impression of the presence of insects or worms under the skin and causing him to scratch. There exists an interesting observation of Ehrlich's, in his experiments with mice above mentioned, which closely recalls these paresthesias and hallucinations based upon them. One of his mice, after three weeks' use of cocaine, began to gnaw its limb, so that in the course of the next few days the whole right thigh down to the knee was entirely denuded. Ehrlich's explanation of this remarkable fact is that paresthesias due to degeneration of the peripheral nerves provoke the gnawing, while the simultaneous anaesthesia of the skin leaves the latter without the protection of sensation.

While some writers deny the existence of symptoms due to withdrawal of cocaine in cases of well-formed habit, others, like Obersteiner and Erlenmeyer, affirm the contrary. According to Obersteiner they frequently appear only after the lapse of a fortnight and consist of sudden collapse and a feeling of impending death. Erlenmeyer emphasizes the vaso-motor disturbances as palpitation, weakness of the heart, dyspnoea, syncope, depression of humor, enormous weakening of the will power. According to all writers the prognosis of the

cocaine habit is not a good one, as patients very readily relapse. It is reported that the habitual use of cocaine among the negroes in our Southern States is deplorably common, and that, no adequate restrictive measures upon its sale being in force, it is on the rapid increase.*

Carl Koller.

COCCIDIA. See *Protozoa*.

COCCULUS INDICUS. (TOXICOLOGICAL).—Cocculus indicus is the dried fruit of *Anamirta paniculata* or *Menispermum cocculus*, order *Menispermaceae*. It is a climbing plant indigenous to Asia, India, and the neighboring islands. This fruit or berry is also known as Cocculus indicus, cocculus, Indian berry, Indian cockle, fish berry, fisher's berry, and Levant nut. The berry is shaped somewhat like a kidney, and is about the size of a small marble. It consists of a light yellow seed of excessive bitterness, covered with a woody shell. The external coat is of a dark-brownish color. This fruit has been used to adulterate beer and ale in order to make them more bitter and inebriating. It is extremely poisonous to fish, and on this account has often been put into the water of fish ponds. It enters into the composition of various decoctions for killing vermin. Of late years the chief importance of this berry consists in its being the source of picrotoxin. The shell contains two inert principles: menispermol and paramenispermol. Picrotoxin (C₂₀H₂₄O₁₂), the active principle, was discovered in 1820 by Boullay. This drug may be prepared by extracting the berries with boiling alcohol. The crystals are odorless but very bitter, neutral, and soluble in caustic ammonia; also in a large proportion of cold water, far more easily in hot water, and in thirteen parts of alcohol. There are no official preparations of Cocculus indicus except picrotoxin itself. The antagonist is chloral, which opposes its cerebral and spinal effects, although it has the same depressing power over the heart and respiration. Anaesthetics control the convulsions incident to the overdose of picrotoxin; and acetic acid also affords relief.

The physiological action of picrotoxin is that of a cerebro-spinal stimulant, affecting particularly the centres in the medulla. It slows the action of the heart as well as respiration after having accelerated them transiently.

*As Dr. Koller's connection with the employment of cocaine as a local anesthetic has often been stated erroneously, I requested him to furnish me with a brief account of the actual facts, in order that I might publish it as an addendum to the main article on this drug. From the letter which I received from him in response to my request I quote the following:—
"The events which led to the therapeutic use of the anesthetic properties of cocaine were by no means accidental, as represented. On the contrary I had, one year before the summer of 1884 (the year in which my cocaine experiments were made), experimented with various substances (morphine, bromide, chloral, etc.), in order to find a local anesthetic which I thought would be valuable in eye operations, as the general anaesthesia, with its sequel of vomiting, etc., is not desirable for these operations. I gave these experiments up as unsuccessful, but my mind was prepared to grasp an anesthetic as soon as it presented itself. It happened that my friend, Sigmund Freud (Privatdocent of Neurology in the University of Vienna), was making experiments on the physiological action of cocaine, and he gave me some to take internally. I took it and felt the numbness of the tongue, and said to myself: Here is an anesthetic. I went at once into Stricker's Laboratory, where I took a guinea-pig and made the experiments which established in my mind the usefulness of cocaine as a local anesthetic. In less than two weeks the experiments were finished. I gave to Dr. Brettauer, of Trieste, a vial of the solution. He was travelling through Vienna to Heidelberg, to attend the meeting of the German Ophthalmological Society, and there he exhibited for the first time my experiments. That cocaine makes the tongue numb was nothing new, but could be found in every text-book on toxicology. That the anaesthesia of the eye cannot be discovered accidentally by a drop squirting into one's eye—while fanciful accident has been alleged as the cause of my so-called discovery—is best shown by the fact that another friend, who, upon the suggestion of Dr. Freud, tried the 'astringent' effect of cocaine in conjunctivitis and trachoma, and who did put it into his own and other people's eyes, failed to notice the anaesthesia. Physiologists had before me put it into the eyes and noted dilatation of the pupil, but had not grasped the idea of a local anesthetic."

"After I had established, to my own satisfaction, the usefulness of cocaine in eye surgery, I induced Dr. Jellinek, a laryngologist of Vienna, to use it in the larynx. To what extent it was used, shortly or immediately after this, in other branches of medicine, is known."

"What I may justly claim for myself is, not that I introduced cocaine into eye surgery, but that I originated the idea of a local anesthetic."—Editor of REFERENCE HANDBOOK.

The brain is not affected to any extent. Picrotoxin has a marked local action, stimulating all the secretions, especially those of the intestines. Röhrig noted uterine contractions. In over-doses its action is much like that of strychnine. It can be differentiated by the character of the spasm produced: that caused by picrotoxin is choreic, affecting chiefly the flexor muscles; that due to strychnine being tetanic, and affecting chiefly the extensors.

The symptoms are twitchings and inco-ordination of the muscles, increased reflexes, spasms, convulsions, delirium, stupor, coma, death from cardiac paralysis; glottic spasm, burning taste, pain in the throat and stomach, vomiting, and diarrhoea. The breath is very characteristic.

As to the fatal dose, according to Blyth, probably from two to three grains would be dangerous for an adult. The frog, which seems the most suitable animal for experimentation with this drug, shows an extreme abdominal swelling as a result of its ingestion. There are very few fatal cases of poisoning by picrotoxin in man on record. The absorption of this drug by the stomach and by the body surface is rapid. The method of its distribution in the tissues has not yet been clearly demonstrated. Neither is its excretion by the urine well understood, although the poison has been detected unchanged in this excretion.

The post-mortem changes offer very little which is characteristic. According to Kobert the brain and lungs are congested. The heart is flabby and the salivary glands are swollen. There may be signs of gastro-intestinal irritation and peritonitis.

Kobert gives the following method of separating picrotoxin from the organism: "The extracts from the organism, purified by means of neutral plumbic acetate and freed from lead, yield picrotoxin to amylic alcohol or chloroform. It will reduce alkaline cupric sulphate solution. Evaporated with concentrated HNO₃, then touched with concentrated H₂SO₄, and, finally, upon addition of NaOH solution, it turns brick-red. With H₂SO₄ alone, a saffron-yellow appears." When in aqueous acid solutions, picrotoxin can be extracted by chloroform, amyl alcohol, or ether. After evaporating the solvent the crude picrotoxin can be crystallized out of water and examined.

A test which may be applied is as follows: The suspected picrotoxin is dried and mixed with three times its amount of saltpetre. A little H₂SO₄ is added, after which the mixture is decomposed by an excess of soda lye, when there will appear a transitory brick-red color.

The treatment consists in the use of the stomach-pump or in the administration of emetics, e.g., mustard, zinc sulphate, or apomorphine subcutaneously. Chloroform is valuable when convulsions take place. Amyl hydrate and paraldehyde are useful as antidotes. In order to allay tetanus, chloral, gr. x. to xx. every half hour, may be administered; the effects must be watched. Or, ʒi. of potassium bromide, or, in severe cases, ʒi. of the bromide with gr. xx. of chloral may be given.

Emma E. Walker.

CÆLIO-HYSTERECTOMY. See *Cæsarean Section*.

COCCYGODYNIA.—For this term, sometimes written coccydynia, medical nomenclature is indebted to Sir James Y. Simpson, who gave the name to a painful affection of the coccyx, or of the parts in intimate relation with that bone—claiming for the name the negative merit that it conveyed no erroneous impression concerning the pathology of the disorder.

It is probable that the term embraces several distinct diseases, some of which may be simply neuralgic; some, possibly, rheumatic; some only sympathetic; while others are certainly due to organic degeneration of the bony structure itself, or to fracture or dislocation of the bone.

As the name implies, it matters not what may be the morbid condition which gives rise to it, pain in the region of the coccyx is the symptom that calls into exercise the resources of the medical art.

The affection is more common in women than in men, and is most frequently encountered in women who have borne children, though it is by no means confined to them. It may continue indefinitely, if left to itself, and the pain is sometimes very severe.

The pain is provoked by pressure, by any movement of the bone, or by contractions of the muscles attached to the coccyx. Sitting, and especially rising from the sitting posture, ascending stairs, walking, defecation, and even micturition in some cases, occasion paroxysms of intense suffering.

The principal causes of coccygodynia are direct violence to the coccyx, injuries inflicted during parturition, the influence of cold, and uterine, ovarian, or rectal disease.

The diagnosis is not attended with difficulty. A thorough physical examination will always remove any obscurity and enable the surgeon to detect, by means of bimanual manipulation with one finger in the rectum, any displacement of the bone and to distinguish between this affection and painful hemorrhoids, anal fissure, foreign bodies within the rectum, or any other pelvic disorder with which the symptoms may be associated.

A favorable prognosis may always be given, unless the pain should be dependent upon some incurable disease elsewhere; otherwise, with proper treatment, complete relief can be promised.

The treatment should, of course, vary to meet the conditions that may be present. If, upon investigation, the affection is found to result from uterine, ovarian, or rectal disease, curative measures should be addressed to the primary disorder. In the absence of any such exciting cause, or of any displacement or appreciable disease of the bone, the remedies appropriate in the several forms of neuralgia may be resorted to with a fair prospect of success. Among the most potent of these are opium, quinine, arsenic, salicylate of sodium, blisters, and electricity, and such general medication and such management as the condition of the patient may require.

In the event of failure after a faithful trial of this plan, surgical interference should be confidently advised. Two procedures are available.

One consists in the isolation of the coccygeal bones from the surrounding tissues, by means of a tenotomy knife; the other, first practised by Dr. J. C. Nott, of Mobile, in the removal of the coccyx entire, or of the lower part of the bone.

A modification of the operation proposed by Dr. Nott was suggested a few years ago by Dr. Garretson. He exposes the bone by an incision through the skin, and by means of a "burr" attached to a dental engine, the bone is ground away to any desired extent, leaving the periosteum upon the anterior surface, with all of its attachments, intact.

In the great majority of cases, the thorough division of the muscular and tendinous structures surrounding the coccyx will suffice, though occasionally the extirpation or the enucleation of the bone, or a portion of it, will be found to be necessary to effect a permanent cure.

The complete excision of the bone is followed by no lasting inconvenience, and most surgeons would prefer to do the radical operation at once, rather than incur the risk of failure by doing only a little less, and thereby subject the patient to the ordeal of a second operation.

The operation is made by an incision over the coccyx. All attachments to the borders and to the apex are severed close to the bone by blunt scissors. The apex being thus freed, the bone is drawn strongly backward and attachments to the anterior surface are divided. Disarticulation from the sacrum is then accomplished and, after arrest of all hemorrhage, the wound is closed. On account of the depth and size of the cavity, accurate coaptation by tiers of catgut sutures is recommended.

In one case which has come to the attention of the writer—the case reported by Dr. Floyd W. McRae—relief was not obtained by the ablation of the coccyx entire, but was secured only by the subsequent removal of the sacral bursa and of Luschka's gland, both of which were enlarged.

James B. Baird.