when there is severe kidney involvement the reduction should be slow and carefully watched, and accompanied by very free evacuation of bowels. One other word of warning: A lowered tension often brings with it a feeling of lassitude and weakness, which possibility should be explained to the patient, so that he may not misunderstand it and feel that he is worse because he does not feel as strong as when living with a dangerously high tension.

There is no indication, however, for vasodilatation merely because Bright's disease has been diagnosed from urinary findings, for this disease may exist without any increase in arterial tension; in spite of the extreme position of certain authors claiming hypertension as the causal factor in all cases of Bright's disease. The indications for vasodilatation in Bright's disease depend on the actual demonstration of high arterial tension by the sphygmomanometer, and the amount and frequency of the dose depend on the individual effect in each case.

No case of cardiac, arterial, or renal disease should be treated without the use of the sphygmomanometer, as to attempt to regulate arterial tension without any knowledge of its degree or its action under treatment, is to work in the dark. One-half grain of sodium nitrite is a safe initial dose in an untried case, and a three-hour interval between doses. The adjustment of dose and interval must be made in each case by use of the sphygmomanometer.

SUMMARY:

1. Sodium nitrite is the best vasodilator; it has the most enduring effects; is most stable and dependable; gives rise to fewest unpleasant symptoms.
2. Vasodilatation may be indicated with low or normal tension: *i. e.*, all uncontrollable hemorrhage, either: During operative manipulation; typhoid ulceration; gastric ulcer; pulmonary phthisis; other internal hemorrhage uncontrollable by surgical methods; aneurism; thrombus, etc.
3. High tension is abnormal, and is either the accompaniment of organic disease, or else presages its onset; in either case it demands treatment: first, by general hygienic measures; second, when necessary, by venesection or vasodilatation with drugs—preferably sodium nitrite.

PROSTATIC CALCULI.

WITH THE REPORT OF TWO CASES.

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It is a well known fact that in some way altered prostatic secretion often forms concretions. According to Virchow, and to Morgagni before him, there is a proteid in the prostatic secretion which when present in excess is precipitated in the acini of the gland forming these concretions. The concretions in some instances start up an inflammation of low grade with an excess secretion of mucus. The epithelial detritus, together with the mucus and concretions, forms the nucleus for the deposit of mineral salts forming the calculi. They may be present in any or all parts of the gland. They may be single or multiple, and in a few cases the gland may be so filled with plates of calculi as to give the sensation of one stony shell. In size they vary from a millet seed to a peach pit. They are usually rounded, and when there are many in the one common sac they are often

facetted. At times they form regular stony plates as above stated.

A typical calculus is stony hard, without distinctive odor, and ranges from light brown to dark blue in color. At times calculi resemble porcelain because of their high polish. Sections through them show the larger ones to be formed of distinct lamellæ. Chemically they are composed chiefly of the phosphate and oxalate of lime, together with a nucleus of organic matter. The phosphate of ammonium and magnesium has also been found. In those passing into the bladder or lying in a sac in contact with urine the usual salts of vesical calculi are also found. The following are two quantitative analyses:

Lassaigne.....	{ Phosphate of lime.....	84.5
	{ Carbonate of lime.....	0.5
	{ Organic matter.....	15.0
Dupuytren.....	{ Phosphate of lime.....	60.
	{ Phosphate of ammonium and magnesium..	20.
	{ Carbonate of lime.....	20.

Dupuytren in 1820 was the first to give an accurate description of the condition. The symptoms of prostatic calculi are insidious in onset and the condition is not easy of diagnosis. The majority of the cases reported have been found accidentally. The symptoms are those of a composite picture of vesical calculi and hypertrophied prostate with points of differentiation. The true prostatic calculi occur almost entirely in the young adult, the ages of the cases reported averaging 28 and the extremes being 23 and 30. One may be able to obtain a history of gonorrhea in almost 40 per cent. of cases.

THE SYMPTOMS.

As a rule the first complaint of a patient is that of a sense of fulness in the perineum, together with a burning stinging pain at the end of micturition. Gradually the patient then notices a delay in starting the stream, which difficulty increases with the duration of the case. Shortly after this dribbling at the end of micturition, together with frequent urination, is noticed, and about the same time pus is found in the urine. Defecation becomes excessively painful and when the stool is hard causes sharp darting pains in the glans penis, and testes.

Often on violent effort to lift this same pain comes on, caused by the compression of the abdominal contents against the perineal floor. Priapism of several days' duration has been described in two cases. In several cases frequent emissions have been the sole complaint of the patient, the condition being discovered on physical examination. Temperature of 100 or 101 F. is often present, but uncomplicated cases do not develop septic temperatures or chills. If the case has any of the complications to be mentioned below the symptoms of the particular complication are of course added.

The objective symptoms are the ones on which the differential diagnosis is made. Rectal examination reveals a very much enlarged, exquisitely tender, stony-hard gland. Moderate, and sometimes light, pressure of the examining finger gives the sensation of crepitus and causes exquisite pain. Perineal examination may reveal a tender mass or not, according to the degree of enlargement. The urine is that of a cystitis—ammoniacal, full of pus and occasionally containing blood. Sounding the urethra reveals nothing until the prostatic portion is reached, when a sensation as if passing through a bed of gravel is experienced. The Roentgen rays may also be used as an aid to diagnosis. The cystoscope, aside from its use as a sound, reveals only the picture of a cystitis more or less acute.

In summary then the symptoms are those of an enlarged prostate and a vesical calculus. It differs from an enlarged prostate in the crepitus obtained per rectum and by sounding, and from vesical calculus by the fact that the pain is constantly referred to one point and that the sensation of a moving stone is not experienced.

The sequelæ and complications of the disease are not numerous. The calculi may perforate into the bladder, rectum or perineum. The constant irritation with lessened tissue resistance may be the cause of prostatic abscess. Lastly, but most important, the consequences of a neglected hypertrophied prostate or vesical calculus may follow, namely, pyelitis, pyonephrosis, sepsis and death.

TREATMENT.

The treatment of the condition is essentially a surgical one—the removal of the stones by open operation. Any of the accepted incisions for perineal prostatectomy will do. In my case reported below, operation was refused and the mechanical measures employed were so successful that they will be given in detail. The prostate should be massaged daily with gentle touch for about two minutes. Gradually the pressure can be increased, but if fever should follow massage should be omitted for a day or two. Massage mechanically presses into the urethra the calculi and from there they are voided with the urine or, becoming impacted, can be extracted with urethral forceps.

This method is not without danger, for if Finger's theory as to the shape of the bladder opening into the urethra when that viscus is distended be accepted, a calculus may readily slip back into the bladder. It would then form the nucleus for a vesical calculus, a not very pleasant consequence. At the same time suppositories of ichthyol can be given to allay the acute inflammation. The cystitis is to be treated by any of the approved methods, i. e., bladder irrigations and urinary disinfectants.

The following case occurred in the service of Dr. Hermann Klotz at the German Hospital and I am indebted to him for the permission to report it:

CASE REPORTS.

CASE 1. History.—J. B., male, aged 23, plumber, was admitted July 10, 1907. Past and family history negative. Had gonorrhea four years ago and was cured in three weeks; denied syphilis and chancroidal infection. Four months before admission he had a second attack of gonorrhea that was treated for six weeks with astringents and protargol, at which time the discharge ceased. The urine was still full of pus and after ten days' frequency of urination returned, but no urethral discharge. Frequency of urination persisted together with increasing difficulty in starting the stream and dribbling at the end of the act. He had a sense of fullness in the perineum and severe pain on defecation, the pain radiating to the glans penis.

Examination.—His condition on admission was as follows: Micturition every fifteen minutes and very painful. Urine full of pus and foul smelling. He had passed no calculi. Aside from the genital tract the patient was normal. Penis was normal, no scars nor discharge. Mucous membrane, as seen through endoscope, was normal. A No. 30 Fr. sound passed easily. Just before passing into the bladder crepitus was felt at the end of the sound. Cystoscopy showed the bladder to be acutely inflamed. There were 150 c.c. of residual urine. A Roentgen ray picture was not taken. On rectal examination the finger, immediately after passing the sphincter, was arrested by a rather firm, round, smooth prominence of about the size of a small lemon, which protruded from the anterior wall, apparently the enlarged and hardened prostate gland. On

stronger pressure with the finger one got the impression of a rather hard but thin shell giving way and breaking into fragments, followed by the distinct sensation of crepitation. This sensation was not, however, that of the rubbing of hard stones against each other, but rather that of fragments of layers of a soft slate or shale. Altogether the gland seemed almost entirely composed of or interspersed with numerous layers of soft stone or with incrustations. Laboratory reports on the blood were negative. The urine was that of a severe cystitis. While in the hospital he had a temperature ranging from 100 to 102.6 F.

Treatment.—His treatment and the further course of the case were as follows: He was given hexamethylenamin and bladder irrigations of silver nitrate up to a strength of 1 in 1,000, and his prostate was massaged. After the first massage he passed two fragments of calculi and the next day two more. The fourth passed was the largest of the series and weighed 3 grains. After this he had a temperature of 102.6 F. and massage was omitted for a day or two. He continued to pass from one to three stones a day. At the end of fourteen days he could hold his urine four hours, had slight pain on voiding and none on defecation. Rectal examination showed the prostate to have numerous areas of softening. He continued to pass calculi for two weeks, and with their passage his symptoms gradually improved. At the end of a month he was discharged with the following status: Urine still cloudy, with some shreds. Prostate barely palpable per rectum; no crepitus. Sound on passing into the urethra gave no crepitus. He was able to hold his urine for eight hours and had no pain either on defecation or micturition. There was no residual urine.

Pathologic Report.—The calculi were examined by Dr. O. Hensel of the German Hospital Laboratory, and his report was as follows: "The calculus submitted for examination consisted chiefly of carbonate of lime with some phosphate of lime and a slight amount of organic matter." In all fifty-two calculi were passed, ranging in size from a pinhead to a big grain of corn. All were not saved, but from those preserved their estimated total weight was about 100 grains.

CASE 2.—From the practice of Dr. H. Klotz.

History.—A. L., aged 26, was under my observation and treatment during the winter of 1892-1893 and during the spring of 1893 for frequent emissions, which always left the patient in a rather weak and nervous condition. On account of an advanced endarteritis and incidental heart affection, he was not able to follow treatment very regularly, but altogether local treatment by sounds; the psychrophore, etc., did not seem to have much effect; bromids gave temporary relief. On July 22 the patient particularly complained of having had several seminal emissions in quick succession, followed by severe burning in the urethra, frequent and urgent desire to urinate and occasional interruptions of the act of micturition.

Examination.—On examination through the rectum the prostate appeared moderately enlarged and prominent, but as a whole rather soft except in one spot where a hard, irregular nodule or tubercle could be distinctly made out. The examination was very painful, the pressure on the gland was not followed by the discharge of any secretion, the urine was but slightly cloudy, and no symptoms of kidney affection were present. On July 27 urination was still very painful, with frequent desire and occasional interruptions. On August 5 the patient reported that the previous night, after several days with rather moderate symptoms, an exceedingly severe, sudden pain was felt in the region of the prostate and throughout the urethra; after micturition a hard body was discovered in the chamber; this the patient had brought with him. It proved to be a concrement of about the shape and size of the stone of the date and of a light brown color; it measured 1.5 cm. in length and 0.5 cm. in the smaller diameter, tapering into rather sharp points at both ends. Broken in two pieces, the concrement showed a thin crust of a light brown color surrounding a somewhat softer substance of a light gray and partly distinctly crystalline structure. August 10 examination of the patient through the rectum was not painful, the prostate was much reduced in size and not painful on pressure; the hard nodule had entirely disappeared and this correspond-

ing portion of the gland was soft and could be impressed, indicating the existence of a small cavity; however, not much secretion could be expressed. The urine was perfectly clear; there were no subjective symptoms present, but the seminal emissions did not show any perceptible diminution of frequency. On August 17 a steel sound, No. 28 Fr., was introduced in the bladder without any difficulty. On account of the condition of the general health the patient went into the country immediately afterward, and I have neither seen him again myself nor have I been able to get any further information in regard to his condition from his then family physician.

The literature on the subject is not very profuse. The following cases have been collected. The authority, number and weight of the stones and under what conditions found are given:

TABLE OF CASES OF PROSTATIC CALCULI.

Authority.	No.	Size and weight.	Remarks.
Berard	35	Not given	Found at autopsy.
Bird, Gilding	139	Not given	
Chopart	69	Millet seed	Spontaneous evacuation.
Cooper Astley	84	Not given	
Caspar	1	Size of pea	Autopsy.
D'Altona	1	40 gms.	Operation.
Erdmann	50	Millet seed to pump- kin seed	Operation.
Ferreri	1	120 grs.	Operation.
Goggrund	100	Not given	
Longut	1	Right lobe of gland size of peach pit.	Autopsy.
Louis	6	Not given	Operation.
Malteste	4	Not given	Operation.
.....	22	Not given	Operation.
.....	30	Not given	Operation.
.....	1	33 by 38 by 8 mm.	Operation.
Mander	50	Not given	Operation.
Marcat	109	Not given	Operation.
Marssmeu	2	10 grs.	Operation.
Nelaton	1	Entire right lobe.	Autopsy.
H. Thompson	20	Not given	Operation.
Voillennir	1	Plum-pit	Autopsy.
White	10	230 grs.	Spontaneous.

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THE HEART'S ACTION PRECEDING AN EPILEPTIC SEIZURE.*

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The etiology of epilepsy has been a subject of comment and investigation from the most ancient times to the present day, yet but little light has been shed on its mysteries. The recognition of the cortical origin of the convulsion, and, more important than this, the new viewpoint being adopted by epileptologists, which regards the convulsion or other paroxysmal manifestation of the disease as the symptom and not as the disease itself—these have been the most important steps in advance.

Out of the recognition of the symptomatic character of the attack has grown the idea that the disease is not a unit—is not due to the same cause confined to the same part of the body in every case. Instead, it may be said that every case is an epilepsy by itself; certain it is that there will be found to be several epilepsies.

In regarding the disease as a group of conditions, and not as a unit, we have to meet this question: How do different causes acting on the same cells bring forth the same action? Do they act directly or do they act indirectly through some condition produced by all in common?

Dr. Albert E. Russell, of London, has discussed this question¹ and answered it by suggesting cerebral anemia as a common condition produced by all the underlying causes of the seizure. Dr. Russell suggests that arrest

of the heart's action may in some cases be the immediate cause of the anemia, the arrest taking place just before the onset of the convulsion, *i. e.*, before consciousness is lost and muscular contraction sets in, the failure to pump blood producing the anemia of the brain. In support of this assumption he cites cases, and I may be permitted to briefly summarize the material he presents:

He first quotes two cases (p. 42) with slow pulse, in which convulsions were preceded by cessation of the heart's action. His third case is one in which subacute rheumatism had set in. Benham, the attending physician, was informed one morning that the patient had had several fits, and while taking the pulse it stopped and a convulsion set in. This was repeatedly observed. The urine after these seizures contained albumin, but this soon subsided. The fourth case, in which myocardial disease seemed absent, was reported by Webster. Cessation of the pulse, shown by sphygmographic tracings was accompanied according to duration, by sleep or convulsion.

Russell next quotes a case of cardiac dropsy, and one of uremia (both Moxon's), in which severe epileptic convulsions were preceded by stopping of the heart's beats. A case of epilepsy, also Moxon's, in which cardiac arrest was observed, is mentioned. Dr. Hughlings-Jackson has observed the same thing in petit mal seizures. Dr. Russell reports one case from his own experience and gives the description of another which was reported to him. He concludes:

Sudden cardiac arrest is one of the few possible causes of anemia of the brain. It has been shown that such cardiac arrest does occur in some cases of epilepsy, and it is suggested that this occurrence may be much more common than is generally assumed, and that the rarity of opportunities for making such observation may explain the fact that it is not more widely recognized.

This article and another² by the same author attracted my attention. The phenomenon observed and held to be the cause of the seizure is so simple and so easily observed that it seemed strange that it had not been noted before. Taking together the heart auræ present in some cases and the favorable action sometimes exhibited by digitalis in epilepsy, it did not seem improbable, especially when one considers the rarity of opportunities for observation, as indicated by Dr. Russell, that cardiac arrest might frequently be present.

THE AUTHOR'S METHOD.

This suggestion, so simple and yet so important if susceptible of confirmation, has led to the present piece of work, which has consisted of obtaining graphic records of the pulse of epileptics previous to the seizure. Some six months has been spent in the work which, requiring the observation of the beginning of the seizures, even where material is exceedingly plentiful, is of the greatest difficulty. The time of the next seizure can not be foretold in any case, even approximately, and in order to obtain records it has been necessary to observe cases continually for hours and days at a time, a process which is tedious and laborious in the extreme. Casting aside digital palpation as a physical impossibility, the author arranged an air transmission apparatus whereby the pulsations in a constricted limb were transmitted to a tambour recording on blackened paper. A Janeway sphygmomanometer cuff was applied to the arm of the patient and inflated to some suitable pressure, recorded by a mercurial thermometer. The pulse waves in the

* From the Laboratory of the Craig Colony for Epileptics.

1. Transactions of the National Association for the Study of Epilepsy, vol. iv.

2. Lancet, July 21, 1906.