day before admission had an attack of right iliac pain with vomiting.

September 27. Symptoms above noted have continued, and tenderness is definitely localized in the right iliac region. Bismuth radiograph shows nine-hour ileal stasis.

At operation, an appendix which is free and shows no evidence of inflammation is removed; and an unusually well marked Lane's kink is corrected by dividing the band transversely, loosening up the peritoneum and uniting the defect at right angles to the line of division of the band.

November 1. Condition shows some improvement; constipation less marked.

Case X.—T. S., age 22 years. Admitted October 6, 1915. History of frequent attacks of right iliac pain and vomiting for the past eight months and of constipation for past two months. For eight weeks or more has felt dull and listless and tired very easily.

Examination shows rather marked local tenderness in right iliac region below McBurney's point.

October 11. Abdominal section. A well marked Lane's kink causing obstruction is corrected in the manner described. An appendix showing no evidence of inflammation is removed.

November 1. Uneventful recovery. Has had no pain or vomiting since operation. It is as yet too early to determine the result in this case.

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SIGNIFICANCE OF THE AMMONIA CO-EFFICIENT IN OBSTETRICAL WORK.*

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It has been succinctly remarked that the most beautiful thing of creation is the pregnant woman; and we find Shake-

speare alluding to "the pride of pregnancy." So, in the same ratio, is the parturient woman the most appealing, the most pitiful, the most helpless and the most tenderly cared for of all patients. And why is her condition modified by such adjectives? Because of the perilous and hazardous field she must enter for the sake of bearing an off-spring. In our college days the physiology and pathology of gestation and parturition are doled out in a serious and impressive manner, delineating the snares and pitfalls awaiting the woman if her attendant be ignorant, negligent or indifferent; and later, this elaboration is to be amplified by the master tutor EXPERIENCE. Nevertheless, despite careful and rigid attention to all the laws of the hygiene of pregnancy, certain complications are inevitable, chief of which is toxemia. Here I shall endeavor to discuss this phase of pregnancy in terms of ammonia and nitrogen, as found in a complete urinalysis.

The toxemia of pregnancy manifests itself in the form of pernicious nausea and vomiting and in eclampsia with or without convulsions; but, as the ammonia co-efficient work has to deal with the former our attention will be directed to the value of this co-efficient in cases of pernicious nausea and vomiting.

In adapting itself to the profound changes concomitant with pregnancy, the maternal organism might be declared in a state of war, endeavoring to maintain the neutrality of the blood vascular system, of the nervous system, of the excretory system, of the glands of internal secretion and of the many other vital systems of the human economy when vigorously attacked by the incongruous elements of reproduction. Hence, it is not asking too much of your imagination to assume that this constitutional shock is quite sufficient to cause such lesions of certain emunctory organs that would set up pathological conditions requiring the minute, immediate and careful study on the part of the physician. Of course, as outlined above, the nervous system or the excretory system or even the generative system might be the exciting influence in the condition we are to discuss. Therefore, an *a priori* conclusion might be deduced and for the sake of argument a definite classification of per-

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nicious nausea and vomiting be declared, namely: neurotic, reflex, toxic.

The first two types must be disposed of briefly, for it is the toxic variety that causes most alarm and consequently, is most important. As is thoroughly understood, the reflex vomiting of pregnancy is usually associated with some disorder of the generative organs as retrodisplacements, lacerated os uteri; and, upon correction of the trouble the patient recovers her former good health and goes on to full term. Whether the good results are due to the actual relief of the existing condition or to the mental suggestion, is a debatable question; and though I incline toward the latter view, it behooves me to grant to each one of you the prerogatives of a free agent. The neurotic type is the most frequent, the most amenable to treatment and comparatively of little danger, provided the diagnosis is made sufficiently early to forestall the development of a more serious situation. And, I say it is of little danger if properly handled, because the exciting cause is an inanition, the severity of which depends upon the master psychologist, whether it be physician or patient. Therefore, it seems plausible to assume that pernicious vomiting should be regarded as an intoxication, acid in character, incident to inanition rather than assuming the existence of a real toxemia. However, reverting to a preceding argument, namely, what causes the acid intoxication, we find one of the missing links in the chain of research, and as yet, we are not satisfied to use as a subterfuge the much abused phrase "faulty metabolism," or "faulty oxidation," this is too broad. On the other hand, we can refer to the introduction of this paper, wherein it was stated that the shock of pregnancy causes such profound changes in the maternal organism that it fails to have "a perfect biological reaction to the growing ovum," to use a borrowed phrase.

Having laid the predicate, that we know little of the neurotic type of vomiting in pregnancy, let us next inquire into the behavior of the ammonia co-efficient as observed in these cases. The most comprehensive manner in which to note this factor is by reference to the charts of two cases that have come to my notice within the past year. In chart I, the heavy black line indicates the ammonia co-efficient,

showing its wide variations from the time I first saw the patient until she was discharged. When the patient came under observation she was nearly two months pregnant; she was greatly emaciated; considerable icterus was present; vomiting ranged from fifteen to eighteen times, per diem; unable to retain water at times, to say nothing of the pronounced aversion for all kinds of food; quite despondent, and extremely weakened. Until the first twenty-four hour specimen of urine could be obtained, the treatment consisted of nothing by mouth and rectal feedings of peptonized milk three ounces every three hours, with the full realization that but little absorption of nutrition is recorded by such a scheme. The first complete total nitrogen and ammonia test showed the ammonia co-efficient to be 7.3% and total nitrogen 13.5 Gms. The results of subsequent tests are diagrammatically represented by the curves on the chart, and silent monitors as they are, I call upon the gods of reason to offer adequate explanation for the mystical antics the ammonia co-efficient and total nitrogen performed. Without going further into the case report, and despite the apparently grave physical signs present, the diagnosis of neurotic vomiting was made; the prognosis was pronounced favorable; and such treatment instituted that the woman was restored to sufficient health to continue enabled to continue with her pregnancy, uneventfully, and to be delivered on September 21, 1915, of a nine-pound boy baby, at full term. A study of the ammonia co-efficient curve, showed the following, which facilitated in summing up a positive diagnosis: First, below 10%, an arbitrary zone signifying safety, for the first three days; secondly, the wide oscillations associated with nervous influences, causing inability to retain nourishment; thirdly, with the sudden rise in the ammonia co-efficient there was not the corresponding change in the physical condition; and fourthly, the co-efficient is only valuable in connection with physical signs and clinical symptoms.

The toxic type of vomiting is less frequent, but proportionately more dangerous than either of the two types just discussed. Again we find theories advanced as to the causative factor of this condition, and again we resort to the familiar argu-

ment "faulty metabolism." However, from the autopsy room, we are assured of the existence of serious degenerative lesions in the liver and kidneys, while from the laboratory reports we observe striking changes in metabolism which are usually characterized by marked distortions in the nitrogenous partition, particularly manifested by an increase in the proportion of total nitrogen excreted as ammonia. In connection with these facts the clinical symptoms must be mentioned, and summed up they are: failure to react to suggestive treatment and rest in bed after

In chart II, the first nitrogen determination showed total nitrogen to be 6. Gms.; ammonia co-efficient 22.5% with ammonia nitrogen 1.38 Gms. The second urinalysis gave an ammonia co-efficient of 24.4%, but thereafter for four successive days it fell gradually, getting as low as 18.1%. The interesting feature of the case was the progressive decline of the patient despite the fact that she retained forced feeding very well, and psychology was brought to bear upon her. Twenty-seven months prior to this pregnancy, the patient had had a therapeutic abortion and in consequence of

CHART 1

NEUROTIC VOMITING

February, 1915.

Light black lines: Total Nitrogen.

Heavy black lines: Ammonia co-efficient.

Dotted lines: Urea.

thirty-six to forty-eight hours, marked icterus, appearance of coffee-ground vomitus, and a semi-comatose condition. Most naturally it is the aim of the physician to make a corroborative diagnosis before antemortem symptoms ensue and as the determination of the ammonia co-efficient is an important aid in reaching an early diagnosis, our attention is next directed to this phase in toxic vomiting.

CHART 2

TOXIC VOMITING

March, 1915.

Light black lines: Total Nitrogen.

Heavy black lines: Ammonia co-efficient.

Dotted lines: Urea.

the operation had sustained a cervical laceration with subsequent repair. On making a bi-manual examination to diagnose pregnancy, I observed stitches in the cervix and suggested to the patient the influence that this might have on her condition. Thinking the psychological moment had arrived I seized upon it, but the harvest reaped approximated nil.

Therefore, after all circumstances had been considered, a study of the ammonia

CHART 1—Concluded

February, 1915	March															
	21	22	23	24	25	26	27	28	1	2	3	4				
Total Urea	24	16.5	13.7	25.1	12.2	10.0	10.0	7.0	8.0	13.0	9.5	16.5				
Total Urine	1000	1200	1200	230	1000	2000	2500	1000	635	550	550	700				
Total Nitrogen	13.5	8.4	6.9	15.9	6.6	7.0	7.0	4.2	5.1	7.0	4.9	8.4				
Ammonia	.994	.806	.336	.285	6.25	1.73	1.20	.462	.518	1.03	.583	.806				
Ammonia %	7.3	9.6	4.8	18	18	24	21	16.8	10	14	11	9.6				
Specific Grav.	1.022	1.018	1.011	1.032	1.020	1.008	1.009	1.012	1.013	1.010	1.018	1.013				

CHART 2—Concluded

March	17	18	19	20	21	22	23	24
Total Urea	6.5	6.0	6.0	9.5	10.0	12.0	5.7	?
Total Urine	1300	1375	1500	1425	1250	1100	800	?
Total Nitrogen	6.1	6.1	4.5	7.0	5.0	5.0	6.4	?
Ammonia	1.38	1.49	1.02	1.41	.933	.906	1.59	?
Ammonia %	22.5	24.4	22.6	20.0	18.6	18.1	25.8	?
Specific Gravity	1.012	1.013	1.012	1.009	1.010	1.011	1.008	?

co-efficient curve enabled me strongly to suspect toxic vomiting; and when on the eighth day I found the ammonia co-efficient of the seventh day to be 25.8% and the patient unquestionably more toxic, a therapeutic abortion was advised and promptly performed. This was advised on account of the ammonia co-efficient rise. As brought out above, the ammonia co-efficient in neurotic vomiting might mount to high levels, but I do not think a co-efficient with slight variations and persistently high would be indicative of aught else but trouble with the oxidizing agents of the body, as demonstrated in the case just recited, or in other words, in case of toxic vomiting.

The high ammonia co-efficient might be due to the inability of the liver to properly oxidize nitrogenous material. Furthermore, similar variations of the ammonia co-efficient have been observed in acute yellow atrophy of the liver, in certain forms of gastro-enteritis in children, and in cases of acute starvation. And yet, to maintain that the condition arises from faulty oxidation seems to be quite problematical; for surely, the entire liver does not undergo degenerative changes, as we possess sufficient evidence that the preservation of small quantities of liver tissue will answer the ordinary purposes of metabolism, it seems the verdict is sustained without begging the question.

Then, what reasonable explanation can be advanced for the high ammonia co-efficient in toxic vomiting? At this juncture, the right of ascribing hypothetical theories

must be tendered to the research man who must determine whether the change is directly due to the inability of the diseased liver to effect complete oxidation, or whether it is an acid intoxication or some other condition, and ultimately, to determine whether the toxic material comes from the mother or from the fetus. At the same time definite conclusions relative to the non-coagulable nitrogen co-efficient in the toxemias of pregnancy must be recorded, thus augmenting the usefulness of such indices for estimating the renal and hepatic functions.

In passing, your attention might be directed to the standard of the nitrogen coagulable protein estimates as observed in normal pregnant patients: 420 Gms. as upper limit for non-coagulable nitrogen and 3.9% as upper limit for the non-coagulable nitrogen co-efficient. For more exhaustive study of this co-efficient, which is quite new, I refer you to an article by Dr. E. D. Plass in the "American Journal of Obstetrics and Diseases of Children," Vol. LXXI, No. 4, 1915.

In the present stage of investigation, it can be asserted with impunity that a high ammonia co-efficient (over 10-12%) is indicative of serious trouble, and when associated with clinical findings, proves an admirable diagnostic agent. I do not think a diagnosis of a serious nature, leading to the interruption of pregnancy, should be concluded without a complete nitrogen determination of the urine, because of the omnipresent neurotic element the medical mind knows to exist in every case of preg-

nancy. I would like to ask the question, is there anyone here who has not seen women simulate pernicious nausea and vomiting in order to have their pregnancy interrupted? In case No. 1, some weeks after the initial trouble had been relieved, I learned the patient had endeavored to produce an abortion by the administration of various drugs, and failing, had hopes of securing the aid of a physician to relieve her of the unwelcome heir.

This discussion cannot be closed without referring to an incident of more or less importance and interest. Whipple and Sperry, until recently of Johns Hopkins Hospital, examined a series of blood specimens from every patient delivered in that institution by surgical procedure with chloroform as the anesthesia. This included patients with severe toxemia and those in excellent health. They demonstrated the identical lesions of the liver (fatty degeneration with central necrosis of the lobules) as are found in cases of toxic vomiting. Whether or not the autopsy findings in patients dying from toxic vomiting are produced by the pathological condition or by the chloroform used at the time abortion is performed, is a matter of conjecture. At any rate, it is food for thought, and it is the opinion of the writer that the extensive use of nitrous-oxid oxygen anesthesia will aid considerably in clearing up the controversy.

The methods of treating the toxemias of pregnancy have not enjoyed immunity from the workings of brilliant minds. For instance, Mayer, Halladay and Terunne fed patients corpus luteum. Luquex administers 1 Gm. sugar for each kilogram of body weight. Rebaudi and Seigmund give thyroid extract and adrenalin. Until the etiology is more comprehensively explained, there will be as many methods of treatment as cases of toxemia. But, the main argument to bear in mind is that starvation is most often the predisposing, as well as the exciting cause.

CASE REPORTS

Case I.—Mrs. C., white, age 40. 4POM.—Seen for the first time on February 19, 1915. The following history was obtained: For nearly two months, since December 21, 1914, the patient had been suffering from severe nausea and vomiting, both being considerably aggravated one week before I saw her. She had the greatest aversion for food and liquids, especially water; had retained nothing by mouth for the week before my first

visit and had lost considerable sleep, being unable to sleep because of the worry over her condition. Considerable loss of weight. Markedly devitalized and had been decidedly icteroid for several days. Several attempts to produce an abortion had been made by the administration of drugs by mouth.

Treatment: absolute rest in bed, nothing by mouth, forced rectal feeding of peptonized milk, three ounces every three hours. Enemata of glucose and soda bicarbonate, aa $\bar{3}$ i twice daily. After the third day the suggestive treatment was begun, which seems to have aggravated the neurosis, judging from the rise in the ammonia co-efficient. Cerium oxalate gr. v, and soda bicarbonate gr. x, by mouth, every 4 hours. Silver nitrate gr. $\frac{1}{4}$ and pepsin gr. v in capsule, t.i.d. Blaud's pill t.i.d. Bromid solution at night. The diet was nourishing and moderate in quantity. No raw fruits. On sixth day of illness the patient saw numerous callers against advice, and had extremely nervous spell with accompanying variations in the nitrogenous determination. The diet was again restricted and rectal feedings were forced with salutary results.

Urinalysis: no albumin; no acetone; considerable indican; no casts.

Results: full term gestation, nursing baby and good health.

Case II.—Mrs. S., white, age 32, 1POM.—Patient was first seen on March 17, 1915. The following history was obtained: Two and a half years previously she became pregnant, and from the first week of pregnancy until the sixth month she was confined to bed with persistent nausea and vomiting. She put herself in the hands of physicians and after consultation, they agreed the only alternative to pursue was a therapeutic abortion, and promptly performed it. The condition improved and until Feb. 15, 1915, she enjoyed uninterrupted health. On this date she missed the menses for the first time, and in a day or two afterward began with nausea and vomiting of the pronounced type. When I saw her for the first time and was able to get the history, I thought perhaps she was quite neurotic and that the trouble might be overcome. On the previous occasion the physician diagnosed "kidney trouble," in the language of the patient.

She was in bed and apparently comfortable, except for spells of nausea and vomiting; she was somewhat icteroid; was unable to retain anything by mouth; was unable to sleep, and there was considerable loss of weight. She had a sincere desire for an off-spring.

The following treatment was instituted: Nothing by mouth, enemata of soda bicarbonate and glucose aa $\bar{3}$ i, twice daily per Murphy drip; peptonized milk per rectum every three hours. The patient was kept on this therapy for two days, and as no improvement was made it was deemed advisable to wash out the stomach.

The first complete urinalysis showed a slight trace of albumin (normal trace) and no casts. Acetone positive. Indican positive. Ammonia co-efficient 22.5%. Total nitrogen 6.0 Gms. to the litre Ammonia nitrogen 1.38 Gms. Thinking the acidosis was a starvation condition, the patient was removed to the hospital where especial attention could be secured. Here the same treatment was

pursued and there seemed to be marked improvement for three successive days. The stitches left in the cervix at the time of the first therapeutic abortion, were removed with the hope of obtaining salutary results, and though there was slight improvement, it was not lasting. Given bromids with effect. Same enemas given, as at home. She was started on liquids per mouth on the seventh day (3-23-15); and after the first feeding was unable to retain anything. This feeding was instituted upon the strength of removing the stitches and for psychology. The condition grew progressively worse and the patient seemed more profoundly toxic. The ammonia co-efficient had risen to 25.8%. The icterus was more pronounced. The pulse was 110, an increase of 20 beats. After a thorough study of the nitrogen determination, and after the clinical symptoms seemed aggravated, the pregnancy was terminated March 24, 1915, by dilatation and curettage.

Results: Uneventful recovery immediately following operation.

SUMMARY

With this very inadequate and cursory analysis of this commanding subject, the following conclusions might be adduced:

1. The imperfect reaction of the maternal organism to the growing ovum is the usual predisposing factor in all cases of vomiting in pregnancy.
2. Reflex or neurotic influences are usually the exciting factor.
3. True toxemic vomiting is accompanied by serious changes in metabolism.
4. A high ammonia co-efficient is not *specific*. It may indicate toxic vomiting or starvation following neurotic vomiting, or an acidosis due to various causes.
5. The ammonia co-efficient is merely a danger signal and is always to be considered in connection with the clinical symptoms. This is especially applicable to high co-efficient.
6. A low ammonia co-efficient indicates neurotic vomiting and is readily treated by suggestion.
7. When there are slight variations of and a persistently high ammonia co-efficient, a positive diagnosis of toxemic vomiting is indicated. When the ammonia co-efficient curve has wide variations, sometimes falling to a low percentage, and is associated with pronounced nervous influences, there is little doubt that one is dealing with neurotic vomiting.
8. Chloroform produces characteristic lesions of the liver, and therefore should not be used as the anesthetic. The best anesthesia is nitrous oxid oxygen.
9. The determination of the non-coagu-

lable nitrogen co-efficient assists in differentiating renal from hepatic conditions. Its chief use is to indicate the extent of renal involvement.

LOCAL ANESTHESIA IN ABDOMINAL SURGERY

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During recent years indications and demands for local anesthesia have steadily become more and more recognized until now in some fields of general surgery the method demands its just recognition and adoption. But for the reason that the profession has been less prone to make use of local anesthesia in abdominal surgery I take occasion to draw attention to its uses in this especial field.

We hope to show that, by the technique as outlined below, we fulfill in a large measure the demands which Crile has outlined in his notable animal experiments. Through the "twilight sleep," produced by liberal doses of scopolamin and morphine, is eliminated largely psychic shock; through nerve blocking and infiltration anesthesia is eliminated traumatic shock; and with these and the small amount of post-operative discomfort following local anesthesia we fulfill in a large measure the indications as outlined by Crile in his efforts to produce a wholly shockless anesthesia.

In the last eighteen months we have done, under local anesthesia, eighteen abdominal operations, consisting of eleven cases of chronic and acute appendicitis; two cases of gastro-enterostomy, one for ulcer and one for carcinoma; one drainage in generalized peritonitis; and four cases of exploratory laparotomy, one proving to be chronic appendicitis, which was removed; one a fibrous gall-bladder with adhesions, which was removed; and in two no operation was done, one of which proved to be an early tuberculous peritonitis without demonstrable focal lesion. A large number of these cases have been among patients in the institution (fifteen)