

Structuras cured in 6 weeks. Acoustic balance restored in 48 hours and deafness exchanged for hyperacousis.

Valvular occlusion of the external auditory meatus by a new growth, causing grave reflex symptoms. Reported before the American Otological Society 1903. Seen at the Massachusetts Charitable Eye and Ear Infirmary, through the kindness of Dr. Z. L. Jack, April, 14th, 1903. Mrs. E. W., a well nourished, neurotic woman with a haggard expression. Age 31. Declares that she can no longer endure her distress, which she is unable to describe. Complains bitterly of indescribable misery and discomfort in her head, sleeplessness due to the oppression in left ear, and severe headache, deafness and inability to do any work, read, sew or fix her attention, without extreme effort, inability to sleep and consequent irritability, nervous exhaustion and mental confusion. She said that she was helpless, no use to herself or any one else, and that she wished to die if she could not be cured. She locates the source of her trouble in her left ear, which has been treated by many "specialists," but her condition has steadily grown worse. Nose is occluded by engorged turbinals. She has a slight strabismus. Appearance and hearing of right ear normal: left ear 3-25, conversation voice. Inspection shows a normal meatus, except that at the orifice the upper wall sags sufficiently to be in contact with the lower for a distance inwards of about half an inch, and closes the meatus like a valve. Drum membrane appears normal. On questioning the patient it appears that the meatus becomes hermetically.

Foreign body in meatus. Seen through the kindness of Dr. Gorham Bacon, February, 18th, 1904. Mr. M. C. aged 22, complains of tinnitus in left ear. Inspection shows a piece of cerumenous-looking substance resting against the drum membrane. This I readily remove with the syringe. It proves to be a bean. Patient declares that the

bean has been in his ear since his seventh year. After drying the canal, all symptoms have disappeared, and the membrane appears normal. The canal was large and had a spacious posterior pocket. There was very little cerumen and epithelium removed with the bean. The skin was separated from the bean, which was brown, about the color of a baked bean.

Vertigo from impacted cerumen. Seen through the kindness of Dr. Albert H. Buck, November, 2nd, 1903. Mr. J. B., aged 42, complains of "swinging" vertigo for the last four months. Says he "drops right in his tracks. Feels it coming from the legs up." He says his left ear has been stopped for three or four years. Inspection discloses impacted cerumen in left meatus. Hearing in the other ear good. I remove the cerumen with the syringe, and all sensations and symptoms of vertigo disappear on the instant.

Deafness of twenty years cured by removing cerumen. Seen at the Vanderbilt Clinic of the College of Physicians and Surgeons, through the kindness of Dr. Robert Lewis, Jr. October, 18th, 1903. Mr. A. B., aged 27, complains of increasing deafness in his left ear. Cerumen is seen packed in both meati. I first syringe the cerumen out the right ear. Immediately the patient is wondrously struck, declaring that he hears in the right ear for the first time. He admits later that the childhood he had heard with both ears. The membrane appears in fair condition. The hearing in the left ear is also restored by syringing out the other plug of cerumen.

Empyema of all the sinuses of the nose, seen through the kindness of Dr. John L. Adams. Mr. N. S., 20 years of age, paper-box maker. History of case dates back a year and a half. Now complains of occluded nares and profuse purulent discharge. Inspection of the nares shows purulent discharge coming from the vault and

from between the middle and lower turbinates on both sides. Transillumination shows the frontal and maxillary sinuses opaque. I remove part of both lower tubernates, at several sittings. Open up and drain the frontal sinuses through the nose. I partially remove the ethmoidal cells with the curette and Myles' punch. The sphenoid sinuses found discharging, and I open both with the curette. Open the right maxillary sinus through the middle meatus. At frequent intervals cleaning and curetting. August 27, 1904, after neglect of treatment patient returns for the first time, with frontal pain and tenderness, which is relieved by curetting and opening up the sinuses for free drainage. Patient pale and appetite poor. December 12, patient very well, with good color. Nasal secretion not yet perfectly clear.

Complicated nasal obstruction, causing serious aural and reflex disturbances, seen at St. Bartholomew's Clinic. Mr. R. S., aged 25 silk manufacturer. Complains of severe frontal, parietal and occipital headache, trifacial neuralgia, difficulty in reading and in fixing the attention for any length of time sneezing fits, severe nose-bleeds commencing spontaneously at four years of age, tinnitus, dizziness, and discharging ears. Inspection shows nose absolutely occluded by an S-shaped deflection of the septum, combined with extensive bilateral spurs. I perform a modified Asche operation under ether. After the convalescence I remove the spurs on both sides, and later on part of lower turbinates. Nasal breathing is established and all the symptoms gradually improve; headaches cease, mental condition improves, eyesight acute, and later on, December 28, the ears, without special treatment, cease discharging entirely and cicatrize. Tinnitus ceases August 13, 1904. The hearing is improved and remains good in one ear and fair in the other. All unpleasant symptoms disappeared. Last seen, December .., 1904. Patient in the same good condition.

Mouth breathing from chronic engorgement of the turbinates, seen at the Presbyterian Hospital, October 10th, 1904, Mr. J. P., aged 23, a cigar manufacturer. Trouble for five years with constant nasal occlusion. Inspection: Nares occluded by enormously engorged lower turbinates, mucous membrane fairly good color. I insufflate powdered supra-renal gland. The turbinates shrink leaving free nasal fossae, and disclosing a small spur. I then apply a solution of nitrate of silver, and instruct the patient to spray his nose with Dobell's solution twice daily. A week later patient is seen again. There has been no recurrence of nasal obstruction. Nares normal. All treatment stopped. The cure will probably be permanent if the patient changes his occupation.

Chronically engorged turbinates restored to normal function after our treatment, cealed, and that the vacuum forming on outer surface of the drum causes her unpleasant symptoms by drawing out the drum membrane. I remove a small free subcutaneous fibroid of the keloid type under nitrous oxide anesthesia. Wound heals in three days. Left drum membrane and hearing normal. The patient said that as soon as she quite gained her mental equilibrium after the anesthetic she found complete relief from her disagreeable symptoms, and that she now has perfect nasal breathing, a condition which she can scarcely remember to have enjoyed before. November, 1st, 1903, she still has occasional headaches, but none of the same symptoms she formerly had.

THE EFFECTS

UPON THE KIDNEYS OF VIOLENT AND PROLONGED EXERCISE
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Nearly twenty-four hundred years ago, on the morn-
ing of the twelfth of September, in the year 490 B. C., a
battle took place on the Plain of Marathon in which an
Athenian force of 10,000 men defeated the Persian army
100,000 strong. To announce this great victory a messen-
ger ran from Marathon to Athens; and to commemorate
alike the victory and his performance, a race was institu-
ted at the Ancient Olympic Games corresponding in dis-
tance and conditions to the course from Marathon to
Athens.

At the New Olympic Games in 1896 this race was revived and the course was laid out from the town of Marathon to the Stadium in Athens. This race was open to athletes from all parts of the world and was won by a Greek shepherd, none of the French, German, English or American contestants being in sight at the finish. Several members of the Boston Athletic Association entered in this race. Since 1896 an annual Marathon race has been held on Patriots' Day, April 19, by the Boston Athletic Association. The course extends from the town of Ashland to the Boston Athletic Association Club House in Boston, a distance of twenty-five miles or forty kilometers: The course is along an ordinary New England road-way for about two-thirds of the distance, and the remainder is over the macadamized park-road leading into the City of Boston. The road traverses a rolling country with a general slope downward, but two of the hills are long and trying. The runners are required to proceed on foot over the specified route, and without any assistance. There are no other restrictions, and they may partake of food and drink on the way. Each runner is accompanied by an official guard on a bicycle, usually a volunteer from the Ambulance Service of the State Militia.

This race arouses much interest and enthusiasm in Boston, and several series of observations on the runners have been made and published. In 1899 Drs. Harold Williams and Horace D. Arnold reported the results of examinations of the runners of that year in: "The Effects of Violent and Prolonged Muscular Exercise upon the Heart." (*Phil. Med. Jour.* June 3, 1899). In 1902 Dr. Ralph C. Larrabee published "Leucocytosis after Violent Exercise" (*Jour. of Med. Research*, Jan., 1902), basing his paper on a study of the blood of four contestants in the race of 1901. In the same year Dr. Larrabee published also "The Effects of Exercise on the Heart and Circulation." (*Bos. Med. and Surg. Jour.*, Sept. 13, 1902.) In 1903 appeared "Observa

tions upon Long Distance Runners" (Bos. Med. and Surg. Jour., Feb. 19, 1903), edited by Drs. John B. Blake and Ralph C. Larrabee, with contributions upon Pulse, Weight and Temperature, from Drs. John B. Blake and David D. Scannell; upon Pulse Tracings, from Dr. Allen Cleghorn; upon the Blood, from Drs. Ralph C. Larrabee, Wilder Tilston and William R. P. Emerson; upon the Hearts, from Drs. Ralph C. Larrabee and Lawrence W. Strong; and upon the Kidneys, from Dr. John M. Connolly. From all the publications I have drawn freely in the preparation of this paper.

Why this contest has seemed worthy of such extended study and comment will, perhaps, be better understood when it is said that the winner, usually the first two or three runners, over the distance in less than two and three-fourths hours. In this paper an attempt will be made to present the results of the examinations of the urine, made during the three years 1901, 1902 and 1903.

RESULTS.

The most important facts learned by these examinations are summarized in the following tables.

1900	No. of Urine	Am't. in cc.	COLOR	REACTION	Sp. Gr.	Urea 1 of ^o	Uric Acid of ^o	Chlorides of ^o	Phosphates of ^o	ALBUMEN
H. H. P. C.	1	120	Normal	Neut.	1.018	1.64	0.024	0.688	0.12	O
		90 2	High Normal	Str. Acid	1.030	2.46	0.082	0.212	0.19	Sl. Trace.
T. M.	2	125	Normal	Acid	1.023	2.59	0.035	0.704	0.17	O
		120	High Normal	Str. Acid	1.027	2.08	0.024	0.070	0.15	Sl. Trace.
D. G.	3	110	Normal	Sl. Acid	1.023	2.90	0.062	0.795	0.14	O
		240	Normal	Str. Acid	1.021	2.40	0.018	0.273	0.30	V. Sl. Trace.
T. C.	4	128	Normal	Acid	1.028	3.03	0.059	1.214	0.11	O
		90	High Normal	Str. Acid	1.027	2.21	0.047	0.849	0.09	Sl. Trace.
E. C. R. Jr.	5	130	Normal	Sl. Acid	1.027	2.71	0.035	0.789	0.125	O
		120	Sl. H. Normal	Str. Acid	1.026	2.40	0.024	0.304	0.15	V. Sl. Trace
H. N.	6	120	High	Acid	1.020	2.40	—	..	..	O
		60	High	Str. Acid	1.034	1.80	—	..	..	• Sl. Trace.
T. J. H. Ks.	7	30	Normal	Acid	—	2.96	—	..	..	O
		90	High Normal	Str. Acid	1.024	2.46	—	..	..	Trace.
H. L. W.	8	120	Normal	Acid	1.026	3.20	—	..	..	O
		20	High Normal	Str. Acid	—	2.40	—	..	..	Trace.
J. L.	9	60	High Normal	Acid	1.029	2.59	—	..	..	O
		30	High Normal	Str. Acid ¹	—	2.14	—	..	..	Trace.
J. J. Q.	10	90	High Normal	Str. Acid	1.021	2.77	—	..	..	Sl. Poss. Tr.
		60	High	Str. Acid	1.026	2.27	—	..	..	Sl. Trace.
W. K. C.	11	90	Normal	V. Sl. Acid	1.020	1.64	—	..	..	O
		30	Normal	Str. Acid	—	2.77	—	..	..	Sl. Trace.
L. B.	12 3	30	Normal	Acid	—	2.77	—	..	..	O
		120	Sl H. Normal	Str. Acid	1.021	2.65	—	..	..	V. Sl. Trace

(1) In these quantitative estimations Frederic J. Lewis, M. D., Instructor in Histology and Embryology, Harvard Medical School, gave valuable aid.

(2) After the race, in red.

(3) Completed seven miles only

1901	No. of Urine	Am't in cc.	COLOR	REACTION	Sp. Gr.	Urea 4 o/100	Uric Acid o/100	Chlorides o/100	Phosphates o/100	ALBUMEN
D.	13 5	140	Pale Normal	Acid	1.025	3.03	1.117	1.03	0.0900	O
		200 6	Pale N. Sl. tur.	Str. Acid	1.020	2.27	0.024	0.33	0.1060	17 120
S.	14 7	130	Normal	Acid	1.030	3.28	0.035	0.89	0.1575	O
		125	N. Sl. turbid	Acid	1.026	2.96	0.017	0.78	0.0900	17 300
C.	15	60	Normal	Acid	1.029	2.52	0.012	0.76	0.0225	O
		65	Normal	Str. Acid	1.015	1.45	0.023	0.44	0.0338	17 60
K.	16	140	Normal	Acid	1.025	3.28	0.053	0.80	0.0600	O
		135	Normal	Acid	1.030	2.65	0.141	0.36	0.2250	37 40
G.	17	40	Pale	Acid	1.026	3.03	..	0.96	0.0675	O
		65	Normal	Str. Acid	1.030	2.90	..	0.46	0.1013	17 60
P.	18	75	Normal	Faintly Acid	1.025	2.72	0.012	0.90	0.0675	O ●
		130	Normal tur.	Acid	1.020	2.08	0.023	0.42	0.0890	17 30
De V.	19	75	Pale	Str. Acid	1.027	3.10	0.128	0.80	0.1013	O
		200	Pale	Acid	1.022	2.58	0.012	0.34	0.1125	17 60
H.—Ks.	20	80	Normal	Acid	1.028	2.90	0.081	0.84	0.1350	17 120
		75	Normal	Str. Acid	1.022	2.65	0.012	0.37	0.0450	17 20
P.	21	90	Pale	Sl. Alk	1.025	1.96	0.025	0.80	0.0225	O
		160	High Normal	Str. Acid	1.022	2.02	0.012	0.27	0.0450	37 40
T.	22	60	Pale	Faintly Acid	1.018	1.51	0.050	0.78	0.0225	O
		135	High	Str. Acid	1.027	2.40	0.108	0.38	0.1800	117 210
E.	23 8	70	Pale	Faintly Acid	10.20	2.21	0.015	0.74	0.0338	17 60
		140	Pale	Faintly Acid	1.013	1.70	0.006	0.50	0.0338	17 48
J. L.	24	140	Normal	Acid	1.030	3.22	0.011	0.68	0.1013	O
		160	N. Sl. turbid	Str. Acid	1.016	2.14	0.029	0.17	0.0788	77 80
Mc. A.	25	35	Pale	Str. Acid	1.027	2.40	..	1.19	0.0663	O
		110	Normal	Str. Acid	1.016	2.27	..	0.51	0.1350	O
Mc. D.	26	50	Sl. Pale	Acid	1.026	3.31	..	1.05	0.0900	O
		300	Normal	Str. Acid	1.206	2.98	..	0.44	0.2250	17 60
M.	27	130	Normal	Acid	1.025	3.15	..	1.01	0.0900	17 120
		125	Normal	Str. Acid	1.024	3.03	..	0.54	0.1140	17 48

(4) In these quantitative estimations William E. Connolly, M. D., gave valuable aid.

(5) Ran only 18 miles.

(6) After the race in red.

(7) Ran only 15 miles.

(8) Ran only 20 miles.

1902	Ns. of Urine	Amt in c. c.	COLOR	REACTION	Sp. Gr.	Urea of ^o	Grams of Urea in 24 hours	Uric Acid of ^o	Chlorides of ^o	Grams Chlorides in 24 hours	Phosphates of ^o	ALBUMEN
C.	28	1200	Normal	Acid	1.027	2.65	31.80	0.117	0.759	9.11	0.0956	0
		1130	High	Acid	1.030	2.02	22.52	0.017	0.243	2.75	0.1013	17120
H.—Hs.	29	1250	Pale	Acid	1.030	3.15	39.375	0.081	0.807	10.09	0.0790	0
		1180	High	Acid	1.030	3.28	38.704	0.141	0.564	6.68	0.1131	17300
O'B.	30	1225	Normal	Acid	1.021	2.07	25.602	0.025	0.893	10.94	0.1060	0
		1130	High	Acid	1.023	2.27	25.424	0.011	0.443	4.96	0.1013	17120
		1500	High	Acid	1.030	2.77	41.55	0.029	1.052	15.78	0.1125	0

(9) After the race in red

(10) 31 is 30 one week after the race.

As the results for 1902 were in harmony with those for the two preceding years, the table for 1902 contains only the results of examinations made of the twenty-four hour-amounts.

A few words in explanation of these tables are necessary.

Quantity.—In most cases the quantity of urine passed after the race was quite small. The average time at which the small amounts given in the tables were passed was one and a half hours after the finish. Some of the contestants were able to pass urine almost immediately after the race. In most of these cases the quantity was rather large.

Color.—The color was in every instance higher after the race than it had been before the race. In several cases the difference was very marked. Many of the urines passed after the race were slightly turbid and a few slightly, but distinctly, smoky.

Reaction. After the race the acidity, as shown by the intensity of the color given to litmus paper, was in every case markedly increased. I greatly regret that I did not determine the acidities by titration with decinormal sodic hydrate against phenol phtalein, according to the method described by Dr. Boardman Reed (Reed: Diseases of the Stomach and Intestines, p. 155.)

Specific Gravity.—In many cases the quantity of urine secured after the race was so small that the specific gravity could not be obtained by the urinometers at hand. In the cases in which estimation could be made, there was no constant relative increase or diminution. The majority, however, showed relative diminution after the race.

Urea.—For 1900 and 1901 the percentages only could be obtained. In the majority the percentage of urea after the race was relatively diminished. Much more satisfactory are the results of the 1902 examinations, because in

three cases the twenty-four-hour amounts were obtained. In two of these cases the urea was practically the same before and after the race, in one considerably diminished. It is worthy of note that one case in which the twenty-four-hour amount was obtained one week after the race the quantity of urea had risen markedly. It would be interesting to know if this rise is constant.

These results agree very well with the results from the researches of Fink and Wislicemus in their ascent of the Faulhorn, and also with the later work of Voit and of Parkes, who says that "there is no distinct increase in the excretion of urea after muscular exercise." There is probably no immediate increase after excessive exercise. I am inclined to think, however, that with the Marathon runners there is a later increase depending, as regards the time of its occurrence, upon the time when the men regain their normal appetite. In this connection it is interesting to see that in two cases in 1900, in which it was possible to follow up the urine, the urea percentage still remained below normal three days after the race, and both men declared that they had not yet (April 22, 1900) reached their normal appetite.

The results harmonize also with those of Dr. E. A. Darling in his study on the Harvard University Crews. (*Boston Med. and Surg. Journ.*, Vol. CXXI, No 10, p. 231). He well points out the agreement of these results with previous noted facts as follows: "Physiologists have proved that an increase in the urea elimination above normal limits is usually caused by an increase in proteid digestion and not by an increase in muscular action."

Of course, these examinations and any conclusions based upon them are very unsatisfactory. If we could have the urines for two weeks before the event and for two weeks after, and could secure the whole twenty-four-hour amounts, results of absolute value might issue, but it

is feared that this state of things will not soon obtain. Many of these men come from distant places to take part in the race, and usually leave for their homes as soon as possible after the race. And even those who live in the vicinity of Boston are not particularly impressed with the importance of these researches, and "with the best intentions" they, like college students, (Darling: loc. cit.) sometimes forget, and some of the urine is lost. Only those who have actual experience in the work know the difficulties in the way of a full and satisfactory examination of a runner, tired after a Marathon race.

It is unfortunate that of the three twenty-four-hour amounts, two had urea percentages relatively increased after the race. This is contrary to what is found in the majority of cases examined both in this and in the two preceding years.

If in the majority of cases the urea percentage is relatively diminished after the race, and the quantity for twenty-four hours is also diminished, as would seem to be the case, the results for total urea in the table for 1902 are probably exceptional. Of course, neither from three cases nor from thirty can inferences of any great value be drawn. The work, however, constitutes a beginning which may be elaborated.

Uric acid.—I expected the uric acid to be increased after the race. It would seem, instead, in the majority of cases, to be diminished.

Chlorides.—The chlorides were consistently diminished after the race. The results given in the table for 1901 are the most accurate, as especial pains with the chlorides were taken in this year, as already stated. It will be noted that after the race there is an average diminution of about 50% in the chloride percentages. The table for 1902 with its total twenty-four-hour quantities corroborates fully the results previously obtained.

Phosphates.—The phosphates apparently vary without law:

Albumen.—Albumen was present after the race in every urine. The amounts varied as the tables indicate. It is of interest to note here that Dr. Darling found in the twenty-four-hour amounts several days after the boat races albumen "in 48 out of 83 specimens." "The amount," he says, "was never more than a trace." And it is his opinion that "the traces found in the twenty-four-hour specimens," after a race, "really represented a considerable amount of albumen passed in one urination after rowing, diluted with non-albuminous urine passed during the rest of the day." (Darling: 10c Cit.)

With a view to ascertaining whether this opinion is correct, the urines for 1902, in which the twenty-four-hour amounts were preserved, were saved with each urination in a separate vial. It was found that in two cases the amount of albumen was greatest in the first quantity passed and rapidly diminished; but in one of the three cases the percentage in the second urination was a little more than in the first, and this in spite of the fact that the quantity of urine passed at this second urination was slightly greater than that obtained of the first. All the urinations for the twenty-four-hours contained some albumen. It is probable, then, that it would be nearer the truth to say that the quantity passed at the first urination generally contains most albumen and that this is diluted with less albuminous urine passed during the the rest of the day. I am satisfied that in the Marathon racers the albumen persists, in the majority of cases, for at least thirty-six hours after the race; but from two urines which I obtained in 1900 three days after the race, and from one urine passed one week after the 1902 race, albumen was entirely absent. The quick recovery is remarkable when attention is paid to the sediment found in these cases immediately after the

race. The fact that in three years only four contestants had albumen just before the race after the training that most had undergone is also noteworthy in contrast with "the albuminuria in the urine of a large proportion of the squad under ordinary conditions of training" for the crews. (Darling: loc. cit.)

Sugar.—Sugar was absent in all cases before the race. After the race a slight reduction of Fehling's solution was noticed in two urines of the year 1900. In both of these there had been no reduction on boiling, and the reduction was not visible at the end of eight hours, but was seen at the end of twenty-four hours. It was very slight and was probably not due to sugar.

Sediment.—Like the chlorides, the sediments were consistently alike.

In most of the urines before the race only a few squamous cells were found in the sediment.

In a few of the sediments a rare calcic oxalate crystal was found, and in three a rare acid sodic urate crystal,

In the cases before the race which contained albumen, however, the sediments were alike in showing an exceedingly rare pure hyaline cast, a few leucocytes, a few small round cells and an exceedingly rare abnormal blood globule.

After the race every sediment contained large numbers of hyaline and fine granular casts, a few coarse granular and epithelial casts. There was in all cases more or less blood, normal and abnormal, free and on casts. The amount of blood usually varied directly as the amount of albumen. Brown granular casts were found rarely in many of the sediments, and calcic oxalate crystals, both primary and secondary, in the majority. Spermatozoa were found in several cases. Leucocytes were not many, and there were only a few renal cells free, though many were

seen adherent to the casts. The sediments from the urines of several runners who completed distances of from only seven miles up to fourteen and eighteen differed in no respect from those of the contestants who finished. The urines of two of the bicycle riders detailed to accompany the runners also had sediments exactly like those of the runners themselves. In the specimens obtained three days and one week after the race only a few squamous cells were found.

SUMMARY.

The examination of the urine shows that in every case an active hyperemia is developed during the race, probably due largely to the irritation from the "toxins of fatigue," inasmuch as the word of Dr. Allen Cleghorn has shown that the blood pressure is not increased. This condition clears up quickly, as albumen and casts had disappeared in all the cases examined one week after the race.

The *amount* of urine for twenty-four hours is lessened, the *color* becomes higher, the *specific gravity* rises and the *reaction* becomes more intensely acid, *Albumen* appears in quantities varying from slightest possible trace to a trace, and in the *sediment* we find in every instance hyaline and find granular casts, a few coarse granular and epithelial casts and more or less blood, normal and abnormal, free and on casts. Rare brown granular casts are found in some sediments, and calcic oxalate crystals in the majority.

The *area* is not increased after the race, but, on the contrary, appears in the majority of cases to be less for the first twenty-four hours following the race than for the last twenty-four hours before the race. By the end of a week, however, it has again risen to normal.

The *chlorides* are markedly diminished after the race, It is probable that the output of *uric acid* is diminished.

and that of *phosphorus* increased, but the results vary so much that no definite conclusions can be drawn.

REMARKS.

As we study the runners in the Marathon race and consider the circumstances under which they run, the character of the roads, the numerous hills, the frequently unfavorable weather conditions, add the speed with which they cover the distance, we cannot help realizing how wonderful the human body is in its ability to endure so much with so little evil result. In the three years during which these observations were made there was not one case of serious, persistent after-effects, and the rapidity with which the hearts and kidneys returned to normal is truly astonishing. As will be noted from the tables, several of these men entered this contest more than once, and I have yet to hear that even in these cases any injury whatever has resulted. For instance, Caffrey, in 1900, won the race in two hours, thirty-nine minutes, forty-four and two-fifths seconds, thus breaking all previous records for time. Yet the same runner the following year, 1901, again won in the remarkable time of two hours, twenty-nine minutes, twenty-three and three-fifths seconds, thus lowering his own former record by over ten minutes and establishing the record which has not since been equalled. But Caffrey was in excellent condition at the finish in both years, and after his phenomenal run in 1901, he remarked that he felt able to run back again if it were necessary for him to do so.

Another feature which on second thought appears natural enough, but at first sight causes some surprise, is that the leaders, those runners who make the fastest time, are generally in the best condition at the finish and recover soonest from the effects of their strenuous exertions. This is due, no doubt, to the fact that they are endowed by

nature with capable hearts and other organs and that they have done most by proper preliminary training to inure their bodies to withstand this effort, for it was probably the lack of this preliminary training that cost the original runner his life. In fact, this Marathon race is for all these men only the climax of a long series of similar efforts made in their practice runs, in preparation for the great event. It is interesting to know that the unpleasant effects of which the runners most complain and which persisted longest were blisters on the soles of the feet.

It would be valuable supplement to these observations if the sediments from the urines of race horses could be examined after some great race.

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THE VALUE

OF THE PRESENT QUANTITATIVE TESTS FOR HEARING: WITH
THE DEMONSTRATION OF A NEW APPARATUS:

Many methods and various contrivances have been and are still used in acoumetry. The more complicated ones have never been popular, while the simpler means, though old, are still used and are still the generally accepted standard in spite of their lack of accuracy and the difficulties of application. For the most part the complicated machines are electric devices and although strongly recommended, are open to nearly the same objections as the simpler means. Their special disadvantages are due to changes in the electric current, and their intricate construction.

The Committee of Acoumetry of the last International Convention of Otolgy reported on the choice of a simple and practical acoumetric formula, advising the oldest and simplest means of testing hearing. They stated that they did so in spite of the inherent imperfections in these methods, because none better were to be had. The tests

recommended by the Committee were: Whispered and conversational speech, acoumeter or watch, tuning forks and König rods.

The results of hearing tests vary considerably. One obtains different results if one brings the sounding body towards the patient from those obtained by taking it further away. As a rule the sounds are heard much further when the body recedes than when it approaches. Auditory after-impressions and psychological states explain these phenomena. The ear is not unlike the eye; a receding object is distinguishable much further than the same object when it approaches the eye from beyond the range of vision.

During the tests the eyes of the patient must be covered or directed away from the operator, whose reflected image must not be allowed to reach the patient. It is remarkable how much a slight visual hint will do in the way of increasing the hearing distance of a quick, intelligent patient.

Sentences and words are heard correctly much further than disconnected polysyllables. Polysyllables again are heard much further than disconnected monosyllables, because in each of these cases there is less opportunity to supply the sound by clear guessing when it is not distinctly heard.

One must bear in mind that a little sound entering the other ear increases greatly the sound perception in the ear under examination, since binaural audition is much more perfect than monaural, and therefore the ear not under test should be hermetically closed. A slight pressure with the moistened finger in the meatus is the simplest way of accomplishing this. Too much pressure in the meatus will lower the sound perception of the other ear, and therefore must be avoided. The other precautionary measures in unilateral testing are: First try with the

other ear closed, then with both ears closed. The difference thus found in the results can be credited to the ear under examination, but this gives no sound basis of comparison.

Quantitative hearing tests by air conduction should cover the whole auditory field for high and low notes alike, because the total quantitative estimate is made up of the sum of its integral parts, and no part of the scale should be omitted. Therefore, the tuning fork and König's rods test are included among the quantitative tests.

Whispering Test.—The forced whisper, using the residual air after a natural expiration, gives a more accurate and more easily repeated test than the conversation voice, but tests obtained in this way are not the measure of the hearing for spoken words, nor can this test be repeated with perfect accuracy, because the intensity, pitch and quality are not constant. In whispered tests no different pitch and intensity on the various vowel and consonant sounds must not be forgotten. These require that the same words must be used to make the tests comparable. A whisper allows a rough test of the auditory field by the use of letters having a wide range on the musical scale, from Ra to S., covering the whole auditory field.

The different intensity and pitch of the letter sounds give five different carrying powers. Unfortunately there is no agreement among the various authors as to the actual relative importance or the true value of these factors. Vowel sounds vary in different languages and dialects, and are influenced by the consonant preceding or following them. Consonants have a very wide range of intensity and pitch.

Conversational Test.—The difficulties in testing with the conversational voice are considerable, and it is impossible to eliminate the conditions which cause inaccuracies in the results. These are chiefly the variability in intensity, pitch, clearness of articulation, and quality, as well as the

accent of the examiner. Practice diminishes the variations which the voice shows at different times, but never wholly overcomes them. They make a great difference in the carrying power of the voice, and its intelligibility, sufficient to prevent the accurate comparison of one observer's results with another's, or with his own previous tests. The different values of the vowels and consonants must be borne in mind, as in the whispered test.

In unilateral testing it is admitted that with the spoken voice, the sound enters the other ear, no matter how it may be closed. For this reason, spoken voice tests can approximate accuracy only when both ears are tested together or when the other ear is much deafer than the one under examination. The usual method of making unilateral tests is to compare the results found with one ear closed, and found with both ears closed. This gives no sound basis of comparison, but in practice the difference found is credited to the ear under examination.

Politzer emphasizes the value of testing bilateral hearing, because it gives the true hearing efficiency possessed by the patient for the avocations of life, and does away with the attempt to the test the voice perception of one ear alone, which is, as I stated, always inaccurate.

Voice tests with words, in cases where there is a slow action of the auditory word memory, will show apparently less perfect hearing compared to mechanical sounds. Just as reading is slow when the visual word memory acts slowly. Familiar sounds or known voices are heard more distinctly than new ones. The faculty some people have of reading the lips is another possible source of error which it is hard to eliminate entirely, without the greatest care. Another objection to speaking voice tests is the considerable space required by the tests for ordinary or even low conversational voice. There is no constant relation between the hearing for whispered and that for spoken

words. For these various reasons the mechanical tests are usually used in addition to the voice tests.

Why else use the mechanical tests? Unless as a control for the voice tests?

Mechanical testing devices; watch, acoumeter and tuning fork, cannot be duplicated exactly on commercial scale.

Their dissimilarity makes the results of tests with different instruments not exactly comparable. It makes a considerable difference when and how the sounding body is held in relation to ear tested. Below and in front of the orifice of the meatus is the direction in which the sound is heard furthest, because that is, at right angles to the plane of the auricle.

Acoumeter and Watch.—In testing with the acoumeter or watch it must be borne in mind that they are heard furthest when held at right angles to the plane of the auricle. Therefore they should always be held in the same relative position to the auricle, which usually faces outward, a little forward and downward. A very considerable difference is noted depending on the way the sounding body is held. For instance, a watch held in the hollow of the hand with the broad surface towards the ear is heard much further than if the watch is suspended with the narrow side towards the ear. For these reason it is apparent that the sounding body should always be held in the same way as watch, and in the same relative position to the auricle.

The acoumeter and watch belong to the group of high pitched sounds, and bear no constant relation to the capacity for speech perception. I have at present under treatment a civil service applicant, aged 25, who failed of appointment because the tick of a watch was not sufficiently well heard in one ear, but no defect of voice hearing was notice

ed. Another case: A man, 43 years old; watch left ear O. S. 5 60, right ear O. D. 60.60. Voice left ear O. S. 36.40, right ear O. D. 40.40. A more common case is the man who can hear the mechanical sounds well, and has poor voice perception.

Variations in tests made with the acoumeter may arise from the difference in pitch, intensity and tone, between the various samples and the careless way in which they are sounded.

One watch cannot be compared to another. The same watch varies in pitch and intensity with the time of day and the cleanliness of its works, different watches have a great variation.

Tuning fork tests bear no relation to the hearing for speech. One fork cannot be well compared with another, because of the varying properties of the various samples. Their curves of intensity are very variable and vary with differing initial impulses, which again are very difficult of regulation. Authors do not agree on the curve of the intensity in relation to the time of vibration of tuning forks. Their relation is very complex. In using the tuning fork the interference zones must be borne in mind, and the same side of the fork should always be directed toward the meatus. In testing the length of perception the distance must be constant. In some cases the after-impression continues longer than the sound can be heard; in others the ear becomes exhausted when the sound is prolonged, but if it is interrupted it is perceived much longer. The fork should not be held opposite the meatus longer than is necessary to enable the patient to observe the presence or absence of sensation of sound. It should then be removed from the auditory zone for three or four seconds, the patient meantime being requested to say whether he still hears it or not. The fork should then be brought opposite the meatus again to see if he will hear it again.

To determine the auditory field, the scale should be divided into four zones, according to the Congressional Committee's report: Up to 64 V. D., from 64 to 256 V. d., from 256 again to 3096 V. D., and lastly, those above 3096 V. D. These zones correspond to the voice sounds, 1st, counter octave; 2d, the chest register; 3d, the vowel voice and finally high pitched consonants.

The amplitude of the initial vibration of a tuning fork can be best measured by the method of Gradnigo. In forks of 256 V. D. the Gradnigo-Struycher method is best, and for 3096 V. D. Schwegelaw's method is recommended. For testing the low limit, use 24, 32 and 48 V. D. The 16 V. D. has been discarded. With these low forks care must be taken to make the patient distinguish between the flutter of the air and the note of the fork.

König's rods are recommended for testing sound perception for the scale above the range of the forks, and to determine the upper limit of perception. The same care should be used with these instruments as with the watch and acoumeter, except that errors are more easily avoided. The chief error is that arising from the patient's mistaking the initial blow for the musical note of the rod.

Otologists have labored long for some ideally perfect method of testing the hearing, but till now all have failed.

What sound does the deaf patient wish to hear? Is it the tick of a watch, the click of an acoumeter or the note of the tuning fork? No. Is it the human voice? It is the voice of his fellow beings which can alone bridge over that awful chasm of palpable silence or chaotic uproar which surrounds the deaf, parting him from acquaintances, friends and family. On account of the imperfections of the voice tests other means are used: watchmatch, the acoumeter, the tuning fork, and the König rods. All these methods have difficulties in their application, and inaccuracies are apt to creep in as I have mentioned. But all of

these are used to determine whether the patient can hear in ordinary life the voice of his fellow man.

The fact is that the expert is forced to the use of mechanical tests because the voice tests are imperfect and unsatisfactory in some respects, while the inaccuracies and difficulties of these mechanical tests and above all the fact that in the end they do not determine whether or not the voice can be heard, oblige him to resort to the voice tests. He passes from one to the other and back, and neither is satisfactory, neither is accurate.

Realizing these difficulties, I have been experimenting for several years to endeavour to make some instrument or machine which will secure accuracy and a definite standard and at the same time determine whether the patient can hear the human voice.

It seemed that a phonograph would provide the standard voice, that it could be controlled and would reproduce the same sound with the same intensity and pitch on all occasions.

I soon found many difficulties. There were no standard cylinders which were suitable. The instruments had to be adapted for my use. Before they could be of practical use they had to be so arranged in order that the sound would not escape and thus allow too much to reach the patient. This I have overcome by a sound-proof box.

Then I had to get some device which would enable the operator at will to turn the sound on or off of either ear without the knowledge of the patient.

But most important of all, I had to devise a method by which the amount of sound reaching the patient could be accurately gauged and at the same time be under control of the expert.

I had many failures, but learned a little from each until I finally secured a machine which has measurably at

least cured most of these defects. I shall take great pleasure in showing it to you and have you test it. It certainly does provide a standard voice tests which can be applied to either ear at the wish of the operator and without the knowledge of the patient. It certainly provides a standard for the comparison of tests equal to those used by ophthalmologists.

I would seem as if reasonable care taken in the making of the cylinders, instruments and appliances, would make them all uniform so that the tests made by one operator on one instrument could be compared with those made by another operator or a different instrument.

My machine allows the operator to determine accurately the limit at which the patient is able to hear sufficiently distinctly to repeat the words spoken by the machine. Distance is no longer needed for the voice tests.

My acoumeter provides a sure method of detecting feigned deafness, an important matter in European countries. If the deafness feigned is anything short of absolute, the malingerer will be led into a trap. He is unable to give answers consistent with the varying positions of the graduating valve combined with changes in the malingerer's valve, for he loses all idea of the intensity of the sound because distance is eliminated. When the malingerer feigns deafness in only one ear, the malingerer's valve, turning the sound on and off, rapidly alternating or simultaneously, distracts the patient; he can not give replies consistent with deafness.

The previous methods of testing applied only to somewhat advanced degrees of deafness, which is a very serious loss to the patient; as all otologists know that the worst forms of progressive deafness, if taken in time, offer a comparatively encouraging prognosis.

My machine besides allowing the detection of the

slightest loss of hearing, gives a test for hyperacusis. It will test a hyperacoustic patient in a small office.

My machine reduces extraneous sound to a minimum, doing away with the necessity of testing in a perfectly quiet office.

My acoumeter is the best test for pitch and intensity of the alphabetical sounds which are equivalent to the logographic value of the letters.

My acoumeter is the best means of measuring the psychological factor in audition. This element enters into hearing to a very large extent, and forms one of the most important factors in determining the hearing efficiency. Its true value has not been previously appreciated. The very marked increase of the hearing for polysyllables over disconnected monosyllables and of a sentence over disconnected monosyllables and of a sentence over disconnected polysyllables is due to this psychological factor, or the power of attention and quickness of guessing. In normal hearing, much is inferred from the context. The accurate adjustment of this machine allows the accurate determination of this important factor in hearing, which has not been previously possible.

My acoumeter readily measures fatigue of the hearing mechanism.

My machine is an acoustic masseur which has many advantages for very deaf people and others. I suggest the phonograph as the best and easiest means of giving deaf ears the exercise they require to prevent the rapid decrease of hearing consequent of disuse, and to prevent the psychological deafness which is much an important factor with very deaf ears, preventing the realization of improvement consequent on the alleviation of the cause. The good results of hearing exercises are best shown in deafness following suppuration of the ear, where, with ar-

tificial aids to hearing. the hearing will often increase over a long period of time. This improvement is due to the psychical element, becoming more and more favorable to sound perception, as well as to the mechanical improvement of the sound conducting mechanism, and the functional exercise of the perceptive mechanism.

SUMMARY.

The methods at present in use do not give adequate tests for the perception of the human voice, nor do they give results which can be compared. My phonograph acoumeter does all of these things and more. It overcomes the chief difficulties and inaccuracies formerly accompanying quantitative hearing tests. It gives a satisfaction and accuracy not hitherto attained. It furnishes a test with the human voice, which does not vary and can be multiplied and repeated indefinitely. Unilateral as well as bilateral tests can be applied without doubt or error. Eyesight aids are eliminated. It furnishes a sure way of detecting all feigned deafness short of total deafness; and it is an ideal machine for furnishing acoustic exercise which has been recommended in the treatment of deafness.

OPERATION.

I prefer monosyllables rather than longer words, for the phonograph test, because they have simpler and fewer sound effects giving definite results. Polysyllables give the patient opportunity to guess the sounds not distinctly heard just as in a sentence a clever person easily supplies the words omitted.

The operator is provided with a slip of paper on which the words of the records are printed to enable him to check the words as the patient repeats them after the phonograph.

The patient is instructed to repeat all he hears. His ear tubes are adjusted in his ears, to examiner taking his own tubes. The indicator is placed at 100° on the dial and the phonograph is started. The operator slowly moves the indicator until the patient remarks that he hears but does not understand, or repeats the words incoherently. Then the examiner, still moving the indicator, checks the words which the patient repeats correctly on the word list previously provided. When the patient repeats at least seventy-five percent of the words correctly, out of ten or fifteen words, the scale is read and the test is completed. The reading of the scale gives the acuteness of hearing possessed by the patient. To get the absolute hearing, this number should be squared and multiplied by the percent of words accurately repeated. A quick way of writing it is in the form of a fraction, the numerator being the reading of the scale, and the denominator the percent of words repeated. The ears are tested separately in the same way, by adjusting the three-way valve for the separate ears.

In order to test unilateral malingering, the indicator is placed at a point at which the malingerer hears readily by both ears together, and the operator quickly turning the malingerer's valve with his left hand, cuts off one or the other of the ears, but never both at once. At the same time he marks the words repeated correctly by the patient, with R for right, and L for left, and O for both, or some similar symbol. The result will show conclusively, first, that the patient can hear; second, that hearing of the two ears bears a constant proportion each to the other, if there is no malingering. If the patient is a malingerer can be quick enough to detect accurately every change in the volume and direction of the sound. The same procedure combined with changes in the graduating valve serves to detect bilateral feigned deafness.

THE MECHANISM AND MANAGEMENT OF BREECH PRESENTATIONS

BY DR. M. MC. LEAN.—29 EAST 116 ST. NEW YORK.

In this day of "great things" when our profession is reaching out with eager expectation to every new idea, it may seem somewhat commonplace and trite, to ask your attention to a subject of such ordinary import as one of the simpler problems of obstetrics.

But, if I shall feel sure of one thing, and that is that we shall have for our consideration a theme which *ought* to be of interest to every practitioner in every place.

For; here we have a condition in which the "great professor from the city" cannot secure a monopoly; and we shall not have incentive nor desire, to refer it to such august authority.

For, in the experience of every man, he must some day or other,—and perhaps frequently—stand face to face with just such cases as these which we have now before us for consideration.

And, to no man ought such consideration and study be more interesting and attractive, than to the man who may be practising his calling in such places and under such conditions that he is obliged to rely on his *own* resources and fight the battle for his patient's life manfully and *alone*.

It gives me especial pleasure to have this opportunity to offer what little I have to say on this subject, before so representative a body of scientific men; who have gathered together from so many parts of this great continent, for mutual edification and advancement in our matchless profession: and I beg that the practical features of this modest paper may, to some extent at least, atone for its many imperfections.

A clear understanding of the mechanism of labor in its various aspects, is absolutely necessary to the obstetrician in his endeavours to give intelligent and scientific assistance to the efforts of nature, in the function of child-bearing.

Certain mechanical laws and principles must not only be recognised; but must be so clearly kept in mind that, at the important moment, when their observance is of the greatest consequence, they may stand out clearly, as landmarks to guide us in our conduct of any case.

As in the consideration of all other scientific problems, it is necessary and essential that the analysis, aiming at a solution, should reach back to the fundamental principles involved, to the different factors which bear upon the case from beginning to end.

If it be constantly borne in mind that the parturient act is a *complex* function, involving, not only various *active* forces of expulsion, leverage &c, and *passive* forces of resistance points; but also certain *tissue changes* which alter

the relation between power and resistance at every point through the whole act; then a safer and more conservative appreciation of any difficulty will naturally result.

If, on the other hand, such a function as we have under consideration, be viewed as a simple question of so much expulsive force, overcoming so much resistance; we shall often be led into errors which are destructive to tissues of both mother and child, and even to life itself.

It is not sufficient that we rely on individual discretion, to exercise calm deliberate estimate of a given *difficulty* occurring in labor; unless full weight has been given a priori, to the forces involved in a similar case which is *without* the difficulty or abnormality.

For we have all of the disturbing influences of fears and importunities of sympathising friends; as well as the unhappy manifestations of suffering on the part of the mother, to make deliberate judgment more difficult, than in almost any others presenting themselves for solution.

It is one thing to judicially determine in a scientific meeting, what may be the proper means to employ in this or that case of dystocia; but it is quite another matter in practice, at the bedside, in a private house, to make a careful, sound, and reliable decisions to the exact steps to be taken in like circumstances, to have so clear a view of the whole situation as to make it safe and expedient to take a firm stand in regard to the management.

The truth of this proposition has been so apparent to me in a pretty extended experience, that I have personally felt the necessity of very well grounded rules to govern my actions, when confronted by questions such as we are considering.

And thus, it has been the result of my observations, that he who is best equipped with a clear understanding of all the factors involved in a given case—keeping them

uppermost in his mind at the critical moment—will display the greater skill in rendering assistance to nature's efforts, in case of difficulty or complication. In this way only can the wide divergence of individual experiences be explained in Breech Presentations.

And it is on account of this great difference in results of various methods of managing certain oft occurring cases, that I have felt impelled, or encouraged, to present for your consideration, so familiar a subject as the care of Labor with Breech Presentation.

It would be interesting, did time permit, to note the various opinions as to the dangers to the child, as "laid down in the books" by representative writers on obstetrics. But I will not attempt to cite quotations from these sources to exemplify the point I wish to make. Suffice it to say, that the mortality to the child in breech cases is given, as all the way from one in every four cases 25%, to one in every ten cases or 10%.

Such a tremendous difference in the ratio requires some explanation; and it is to this end that I venture to ask your attention to a few points concerning the mechanism of such labors; with somewhat definite allusion to the mechanical difficulties arising to present a picture of dystocia which may so frequently sacrifice the life of the child.

First, let us consider the normal progress of an unassisted, undisturbed case, of breech presentation.

In such a case, labor goes on very much as in an ordinary cephalic presentation; expect that the first stage is apt to be more tedious, the pains less efficient, and often the amniotic fluid is apt to be partially lost by very early rupture of the sac. Indeed it is a significant hint of such a presentation, when the amnion is found leaking away, even before the first appreciable uterine contractions be-

come apparent. (Of course the meconium may appear in the discharges later also, suggesting more strongly the probability of a presentation of the pelvic and of the fetus).

The second stage—of expulsion—*may* progress as in any other normal case, and the child be extruded safely: when the labor is completed in the same manner as in a normal cephalic presentation.

A very important question suggests itself right here: how many cases of breech presentation would result in death to the child if no interference or assistance whatever should be given by the attendant?

This is very difficult to determine, inasmuch as it is in just these cases that we feel called upon to lend a helping hand, in order to insure the rapid and safe delivery of the child. And I think I shall be able to show that in a considerable number of cases, our efforts at assistance may prove an added danger to the child, thus giving a false estimate or value to the risks due to the presentation itself.

I have attempted to get at the facts in a considerable number of cases as they are recorded; but found only two fatal cases in which the labor had gone practically through the second stage, without *any interference whatever* on the part of the attendant.

The conditions existing in those two cases, will be shown to be very interesting and suggestive; as bearing upon certain questions of the mechanism of delivery under normal circumstances—the breech presenting.

In each of the cases alluded to, the dead child lay with the head undelivered—the chin just within the vagina;—*the arms, with the rest of the body of course, fully delivered,* and lying between the thighs of the mother. The fact that full delivery of the child had been successfully accomplished, except that the head alone remained within the vulvar orifice, is a most important one. In both of these cases

the arms had evidently offered no opposition or impediment to the passage of the child. The child had been completely extruded from the uterus, and the voluntary efforts had failed to come to the rescue, and expel the head entirely from the vagina.

From that situation the head was instantly and easily lifted, without any traction whatever, by the attendant on his arrival at the bedside.

Here is food for reflection, indeed; and from so meagre a showing even, we may deduce valuable theories.

The typical case, then, of normal delivery by the breech would seem to be one in which the fetus is folded in the usual position—with the limbs all folded—flexed in front of the body—the arms lying close against the thorax—the legs and thighs lying snugly against the abdomen—the head well flexed. This order being maintained—*full dilatation and softening of all the tissues* of the passage having been accomplished; the child is driven down by the *vis a tergo*—the successively presenting parts describing the somewhat spiral course which is followed in the strictly regular mechanism of all normal labors.

In such cases, where normal relations obtain between passage and passenger, the delivery will doubtless be terminated with possibly little or no more danger to the child than in ordinary cephalic presentations.

In a few cases, as in the two instances related above, the child may be successfully extruded from the *uterus*; and then, there being no sufficient reflex stimulus upon the vagina, rectum, perineum &c., to arouse the voluntary muscular effort; the *head* may remain within the vulvar commissure, and the child die by asphyxia pure and simple.

But such a sacrifice will surely be of rare occurrence, and will represent but a very small minority of the cases which result in death to the child in delivery.

The head of the living child being driven down safely to the bottom of the pelvis, there need be no dangerous delay in its complete expulsion or extraction; and just here is the very crux of the problem. By what means by what fortunate conditions combined, may such a descent of the head be secured?

First of all the soft parts of the parturient canal must be thoroughly softened, by the natural processes which obtain in the preparations of the passage for the important event of the passing body. Particularly is it necessary that the cervix uteri be *dilated fully* and not partially so; and the vaginal orifice should in like manner have become well softened and relaxed, or distensible. Then the arms must be retained in the proper position of flexion in front of the body the hands being not above the line occupied by the chin.

Indeed it is a self evident proposition that if the diameter of the hands or arms be added to the diameter of the head at the superior strait, all progress toward delivery becomes at once mechanically obstructed, and dangerous delay is caused, just while asphyxiating pressure is being made upon the funis. This mechanical difficulty must be eliminated promptly or the child's life is surely lost.

Every intelligent practitioner, therefore, recognizes this fact, and knows that he must at once get rid of the vicious position of the locked arms; but not every practitioner gives weight sufficient to the fact that this accidental displacement of the arms is *the rock upon which* these young lives are nearly always wrecked; and it must therefore be guarded against,—avoided,—overcome, by every means possible, as the first step towards the salvation of the imperilled child.

Next in order and importance comes the necessity of having the head well flexed, so that the narrow diameters

may be presented, in the proper directions, in the straits and canal.

For, if the head become extended—the chin hooking up above the brim—thus giving the longest diameters as presenting—we shall have head arrested long enough to make a fatal delay before we may relieve the placental asphyxiation.

Let us therefore look into the causation of these two disturbances of a safe mechanism, and see if they may generally be avoided, and those remove the greater part by far, of all the risks attending a delivery by the breech.

While in a few cases it may seem necessary to facilitate dilatation, and descent of the breech, to interfere and bring down one or both feet; it is a decided disadvantage in the vast majority of cases; inasmuch as it allows the body or *causes* the body to be extruded *through* an *imperfectly dilated os*.

Then, when pressure upon the cord begins to do its work—its dangerous work—(and that pressure is, under these conditions, made earlier and more severe) we have the very difficult problem to confront us, of securing the passage of the arms through the tightly encircling os and the much greater diameters of the head to squeeze past the same constricting ring.

Moreover if we make any traction whatever upon the parts first extruded through the vulva, there is decided probability that we shall draw down the body sufficiently to cause the arms to leave safe position on the thorax, and become entangled, as it were in the constricting cervical tissues; thus ensuring their extension upwards and alongside of the aftercoming head.

So promptly and so frequently does this occur especially where the ankles are used for a traction handle that I have long believed that there may be a reflexion excit.

ed in the muscles of the child itself, sufficient at least to lift the elbows away from their place of safety, if not to cause the hands to be thrust upwards above the strait.

However this may be, it is a demonstrable fact, that the arms are almost certainly displaced upwards under these circumstances, where such traction is made.

The body being well delivered, with the spine of the child corresponding to the abdomen of the mother, that is, with the back looking to the front, the chin may be extended badly not only by its impinging on the soft parts, but also by its being dragged around too far to the back of the pelvis; so that it is being opposed to the shorter diameters of the inlet to the bony canal, instead of occupying the oblique diameters where there is found greater room.

The proper management, therefore, of a breech case must be based upon such care and assistance, as will avoid such obstacles, or remove them in the quickest and safest manner.

First, then, let it be borne in mind, that very slow and deliberate first stage must be encouraged from the outset. Let no opportunities on the part of the patient or her friends induce us to hurry the descent of any part of the child before safe preparatory softening and dilation have taken place.

Next, as soon as the breech has rotated, emerged, and restored itself in position again, be ready to encourage and assist the patient in making her fullest exertions at expulsion so soon as the pelvis of the child shall have passed the vulva.

At this point the strong voluntary efforts of the mother will generally be needed; therefore, chloroform, if used at all, should be given only to a degree of a placebo. Assistance should be given by manual pressure over the contracting uterus with the cupped hand grasping the head so as to direct the chin into the strait.

No *traction whatever* should be made on the body or legs; but a hand should be slipped quickly under the thorax of the child, along the posterior wall of the vagina to find the position of the arms.

The elbows (or more, probably the shoulders) being within reach, one arm and then the other is to be rapidly swept down over the thorax, and through the vulva.

At this very time, the properly directed forces being *applied above and without*, the head will quickly follow into the hollow of the sacrum.

Now the body being thrown almost over unto the abdomen of the mother, the chin will descend and cross the perineum, and in a few seconds the head will be delivered entirely.

But should the arms unfortunately have become displaced upwards, so that the elbows are alongside of the head; considerable difficulty will be experienced in dislodging them. It is fairly fanciful and dilusive to attempt to follow directions not infrequently laid down by writers, "to hook the finger in the flexure of the elbow" and thus sweep down the arm, while it is thus extended up into the uterus itself.

The *elbow* is far above our reach; and it is impossible to hook the finger in its flexure. Oftentimes the extension of the arms is so great and the constriction of the servica ring so firm, that the clavicles themselves are forced up alongside the base of the skull, so that the nearest flexure we can reach is the space on *top of the shoulder* as it is jammed against the head.

In some instances this posture is so vicious that the humerus will of necessity be fractured in bringing it through the cervix.

But if it be remembered that so long as the uterus is

allowed to, or compelled to keep in close contact with the head—the aftercoming head,—the arms cannot rise to a dangerous position, we will see the importance of substituting *pressure over the fundus* for all traction from below.

As the manipulation of the arms is of vital importance and the tactile sense of the obstetrician is essential to watch and direct the changes within; it is desirable that the pressure be supplied from above by an intelligent and obedient assistant in some difficult cases. For this purpose I generally equip myself with the assistance of a nurse specially trained for this particular work.

My rule is to conduct the first stage of labor as liberately as possible; not acquainting the patient herself with the possible difficulties ahead, until the breech is at the vulva. Then I try to *detain* the breech through a fair number of pains, in order to secure the conditions desired the softening and relaxation of tissues.

As soon as expulsion becomes imminent I explain to the mother that, in order to save her child, she must help herself without much chloroform, and act as I call upon her to do. Then, so soon as the *pelvis* and thighs are well extruded, my assistant seizes the fundus with the head in the grasp, and makes firm pressure as I direct, combined with the efforts of the mother which I call forth by previous arrangement.

Thus, in the great majority of cases, the aftercoming head is forced into the pelvis as the body is thrown well over the pubis and causes the head to sweep forwards, the face passing almost at a bound over the perineum.

In one case only I have found it necessary or desirable to extract the head with the forceps; so tightly was it grasped in the canal. But in almost every case the head may be lifted from the inferior strait by grasping it with the finger *on either side of the coccyx* so as to flex the head

forcibly and not permit the face to drag behind, as descent progresses. The ease and certainty with which the head may be controlled by this method of manipulation will surprise any one who has tried it for the first time and *no so called* "support of the perineum" is to be compared with it in efficiency. This manipulation of the head as it begins to make pressure on the soft parts about the pelvic floor is so valuable that I desire to make it clearly understood.

As the head begins to distend the parts involving the anus, the perineum, and the tissues *posterior* to the anus, as well as the vulvar orifice; the operator should make pressure on the tissues on the right and left sides of the coccyx just anterior to the sacrosciatic ligaments. The head will be felt distinctly and may be grasped in such a manner as to exert perfect leverage and control of the passing child.

This pressure may be applied in two ways: first, by using the separated fingers of one hand; the middle finger being on one side of the coccyx, and the third or ring finger on the other; second, by using the tips of the fingers of one hand and one side and the fingers of the other hand on the opposite side. It will be seen that this method acts by making direct pressure at a point which allows the force to be exerted from behind forwards, thus not only assisting the progress of the passenger, but also tending to relieve the tension of the soft tissues by dragging them forwards.

It is to be noted that all of this force is exerted far *behind the anal opening*, and does not touch the *perineum at all*. It is undesirable, unscientific, and uncleanly to attempt to manipulate the head by inserting the fingers into the rectum; and pressure of any kind on the perineal tissues is harmful from every standpoint. Dragging the jaw

down by inserting the finger in the child's mouth is inefficacious and sacrifices valuable time in most instances.

In a word properly directed pressure applied, first over the abdomen while the head is at or above the superior strait; and afterwards at the points indicated near the coccyx, when the head has arrived at the inferior strait or beyond; will accomplish more for the safe delivery of the child than all other means.

Following these rules as I have stated them, I have kept record of my last forty-three consecutive cases born by the breech; including twenty-seven primiparae; a number of cases of difficult version, and other conditions of dystocia. And these I have lost *one child*—that being the thirty-ninth case, in which there was a marked deformity of the pelvis and was really a fit case for Caesarian section. This record, of so low a mortality as one in forty-three in a series of difficult cases is of value—suggesting the correctness of most of the propositions which we have here submitted for your consideration.

One of the most interesting points in the mechanism of this particular phase of labor, is the behaviour of the arms of the fetus in all cases which have in no way been interfered with.

I have been unable to find record of a case in which the child was arrested in its descent by the *displaced arms*; and lost *on this account; in cases which had been left entirely to nature's efforts*.

Such cases may have occurred; but if so they are so rare as to be beyond my ability to find reliable record of them.

This fact has been the foundation of my plan for the delivery of Breech cases; and I am convinced, that a full appreciation of the importance of the points I have especially alluded to, will enable us to change the mortality

records of children in these cases in a most surprising and gratifying manner.

To recapitulate in as few words as possible: allow and encourage the first stage of labor to progress calmly and slowly—resisting all attempts or inducements to excite expulsive efforts, until full dilatation and softening of tissues shall have been accomplished.

In every case where it is practicable and safe, avoid all attempts to substitute one or both feet for the breech proper: and let the second stage progress as slowly as possible as the breech passes through the inferior strait. Chloroform, not carried to surgical narcosis may even be used to alleviate unnecessary suffering. But when the trochanters of the child have been expelled from the vulva, stop all anaesthesia—call on the mother to cooperate with you in your efforts to save her child. Have an assistant if possible ready to follow down the descending fundus, and to make heroic and intelligent pressure at the right moment—crowding the head obliquely into the superior strait as the operator shall direct.

Immediately on the unfolding of the expelled lower extremities, quickly slip a hand—with the palm hugging the belly and thorax of the child—into the vagina, and reach for an elbow, and draw it down, sweeping to right or left as the case may be. Instantly reach for the opposite arm, and if it be not readily caught, change hands quickly and introduce the hand which corresponds with the hand of the fetus, and sweep it down as in the first instance. Now the chin will follow rapidly into the lower parts of the pelvis, and be extracted with very little difficulty or delay generally.

Make no traction on the limbs or body after the thighs have been delivered.

I should fail to point a very important lesson in the management of these cases, did I not call particular atten-

tion to the fact that a very considerable number of cases of death in breech deliveries, are due *not* to genuine asphyxia but, to injuries to the spinal cord &c. in rash efforts at delivery by traction below.

Operators are sometimes made aware in a horrible manner of the violence they have displayed by the sudden delivery of the body *minus the head*. I have met three such cases in consultation.

I believe that the recorded results of a uniform method which I am practicing, will speak more forcibly and eloquently of the value of the method which I desire to emphasize, than any attempt of mine to go into more minute particulars in its description.

I claim to have discovered no new and golden path (I offer no new and brilliant surgical exploit) I only plead strongly for a more deliberate recognition of nature's rights, and nature's conserving forces and processes; and ask that obstetric assistance be only applied along these lines; thus reducing infant mortality definitely, positively, and to a most gratifying minimum.

MALCOLM MCLEAN.—M. D.

February 1904.—New York.

The prevention and treatment of Tuberculosis by State methods,

BY GEORGE M. KOBER, M. D. WASHINGTON, D. C.

Consumption stands first upon the list of the principal causes of death, carrying off annually in the United States over 100,000 victims.

Statistics of consumption include almost as a rule only those who die with lung manifestations and little is said of the children and others who perish from tubercular meningitis, peritonitis, bone and other tubercular lesions.

Tuberculosis not only leads the list of diseases in order of frequency and mortality, but the loss entailed by the long duration of the disease, renders the subject of grave importance from an economic as well as a medical point of view. Indeed it has been estimated that the loss to the commonwealth from this disease amounts annually to \$ 240,000,000.

Students of vital statistics have noted with gratification a marked decrease during the past forty years in the

so called preventable diseases, amounting in some cities to over 50 %, the good effects being especially shown in the decrease of Consumption, Typhoid fever and diarrhoeal diseases, and perhaps no two factors have contributed so much to the general result as the improvement of the air we breathe and the water we drink.

The death rate from Phthisis in New York City has fallen from 4.27 in 1881 to 2.29 in 1902, and in Washington, D. C. from 4.12 during the decade of 1876—1880 to 2.62 in 1903.

Recognizing as we do:

1. That tuberculosis is an infectious disease caused by a specific organism, transmissible to healthy individuals under certain favorable conditions.

2. Inherited and acquired predisposition plays an important role in the dissemination of the disease.

3. The germs may enter the system by the respiratory and alimentary passages, and by the skin and mucous membranes if there be an abrasion.

4. That whilst the bacillus has been transmitted through the milk, flesh and blood of animals and man the most common and effective way, is by the dried and pulverized sputum of tuberculous patients.

5. The habitations of consumptives, as well as their personal effects unless immediate disinfection has been practiced are infected houses and objects and liable to convey the disease to others.

The measures for the prevention of this disease on the part of the State should be directed towards the control of the source, and the diminution of predisposing causes.

- a.) *Measure directed towards the control of the source of infection.*

1. Compulsory notification by householders to the health authorities as soon as the disease is recognized. It has been urged that the depressing effect of such information would be too great for the patient, but this will surely be counterbalanced when we inform him, that it is after all a curable disease, and that his chances for recovery are especially favorable if he does not re-infect himself, besides the control of the source is of vital importance for the protection of his own household and others.

The health authorities apart from distributing proper printed directions for the use of the family and the patient as regards the care, disinfection of Sputum, may also resort to the disinfection of the home and personal effects of the patient, especially upon vacation of the premises.

2 The enactment and enforcement of laws against promiscuous expectoration where the sputum is liable to infect others, and provisions for suitable spittons and their proper disinfection in all public places.

3. The streets should be sprinkled and swept at night so as to reduce the inhalation of germ laden dust to a minimum; This appears to be indicated by the fact, that Martin in examining the dust of one of the most frequented Streets of Leipzig, found the tubercle bacillus in about 80% of the specimens.

1. The supervision of the sanitary condition of hotels, theatres, churches, schools, ambulance service, and sleeping cars etc should likewise be under the control of the health department.

5. Marriage with a tuberculous person should not only be discouraged but absolutely prohibited by law; A tuberculous mother should not nurse her infant, and in the selection of a wet nurse a certificate of health should be demanded.

6. Government inspection of dairies and of dairy and

meat products and the extermination of bovine tuberculosis are urgently called for. The writer has tabulated 86 cases of milk-borne tuberculosis, 3 accidental inoculations of men by the topical application of cream and milk, and 12 tuberculous wound infections among Veterinarians and butchers. According to Dr. Salmon during 1900, of 4,861,166 inspected cattle in the United States, 5,279 or 1 in 921 were tuberculous, and of 23,336,884 hogs, 5,444 were sufficiently affected to cause condemnation of some part of the carcass.

The possibility that the germs of tuberculosis may be conveyed by means of flies and dust, suggests that greater precaution be exercised in the exposure of food stuffs in show windows and in the open air.

b.) *The duties of the State in diminishing the predisposing causes to Consumption.*

Having considered the sources of infection and the indications for their control, it is well to remember that in addition to the germ there must also be a suitable soil for its growth and development.

Such a soil is usually found in persons of feeble physique, victims of malnutrition, whose vitality has been lowered from any of the numerous causes which are afloat, whether it be a previous attack of sickness, dissipation, lack of pure air, sunlight or proper food.

Dampness of soil and drainage. The relations between dampness of soil and pulmonary consumption were first pointed out by Dr. Bowditch of Boston in 1865 and Dr. George Buchanan in the 9th Report of the Medical Officer of the Privy Council London 1867 furnished ample statistical proof that consumption became less frequent in certain towns after they had been sewered, and the soil consequently drained. In towns like Worthing, Rugby and Salisbury the deaths from Phthisis after the introduction of sewers were reduced by 36 to 49%.

When we remember that in 1896, 28.7% of the total population, in the United States lived in sewerred towns and 41% lived in towns having public water supplies, we see at once the necessity, that a system of public sewerage must go hand in hand with the public water supply. The neglect on the part of the State not only increases the dampness of the soil, but compels recourse to the various make-shifts for the collection and removal of excreta, and leads to pollution of the air, soil and water.

Insanitary dwellings. Tuberculosis is far more prevalent in dark, damp and insanitary houses. The only reasonable explanation for this is that the ubiquitous tubercle bacillus, which is destroyed by a few hours of exposure to sun light, finds here suitable environment for its vitality and growth; dark, gloomy and badly ventilated houses are also usually damp air abstracts an undue amount of animal heat from the inmates and in consequence produces catarrhal conditions of the respiratory passages which in turn favor the invasion of the tubercle bacillus.

For all these reasons I consider the condemnation of houses unfit for human habitation, and substitution of sanitary houses only second in importance to the destruction of the germs.

The State may not be in position to provide the sanitary homes, but it can at least insist upon regulating the construction and amount of air space, light, heating, and ventilation of dwellings offered for rent.

Building regulations. In addition to suitable habitations the State should interdict the erection of tall buildings and of all buildings covering over 66% of the lot, since they shut out light and air, thus destroying the very object for which broad streets and avenues were created and bringing us back to the insanitary era of the medieval towns with their narrow and winding streets.

Physical culture, public playgrounds and baths. The State should pay attention to the physical development of our youth, and this is best accomplished by proper training, preferably in the open air, in the public schools and playgrounds. The children of consumptives require special attention because of the transmission of vulnerable anatomical elements which render them peculiarly liable to the disease, this predisposition may certainly be overcome in addition to proper food by pure air, methodical gymnastics, systematic hardening of the skin secured by bathing, and no school should be without these hygienic advantages.

Factory sanitation. It has also been shown that a vulnerability of the tissues to the disease may be acquired by dust producing occupations and here the amount of the dust seems less important than the character of the particles which compose it. For this reason no doubt the hard, sharp and angular particles of iron and stone dust are more liable to produce lesions of the respiratory mucosa. In no other way can we explain the comparative innocuity of coal dust the particles of which are quite clear from sharp points and corners. English statistics show, that the coal miners stand at the head of the list, as regards freedom from Phthisis and other lung diseases, in dust inhaling occupations and that the tin miners of Cornwall who inhale a sharp angular and most irritant stone dust furnish the largest number of cases.

Mr. Frederick L. Hoffman in 1900, from the experience of the Prudential Insurance Company for three years, found that Consumption caused the highest percentage of deaths among stone workers, printers, glass workers, book-keepers, plumbers, salesmen, hatters, silk workers and cigar makers. Between the ages of 25 and 35 the proportion was one half among stone workers (64.5%) glass workers (58.7%). Hirt as early as 1871 showed that

men engaged in the dust—inhaling occupations suffer much more frequently from pneumonia and Phthisis, than those not exposed to dust, and that there is practically no difference in the frequency of diseases of the digestive system. The influence of the character of dust is shown by the relative frequency of these diseases per 100 workmen as follows:—

Phthisis. Pneumonia. Digestive Disorders.

Workers in metallic dust...	28.0	17.4	17.8
Workers in mineral dust...	25.2	5.9	16.6
Workers in vegetable dust...	13.3	9.4	15.7
Workers in animal dust....	20.8	7.7	20.2
Workers in mixed dust.....	22.6	6.0	15.2
Workers in non-dusty trades...	11.1	4.6	16.0

While the quantity of dust is perhaps not an unimportant factor, the quality of dust all other chances being equal deserves special emphasis, and it is clearly the duty of the State to formulate efficient laws in regard to factory sanitation and the occupations in general which are injurious to health.

(c). *The duties of the State in the treatment of Tuberculosis.*

It is certain the duty of the State to see, that every patient who has no home or whose environments offer less favorable conditions for his recovery is provided with proper care and shelter.

It may be truly said, that the Sanatorium treatment of Consumptives offers the best chances for recovery and the ultimate extermination of the disease, and the State must shoulder the responsibility in the care of patients unable to bear the financial burdens. Every city of any size should provide facilities for the isolation and proper open air treatment of tuberculous patients, supplemented by General State Sanatoria. Since the identification

of the disease is the first and most important step in the treatment and prevention, the establishment of Dispensaries for the recognition of incipient cases among the dependent classes seems urgently called for. Such dispensaries should become the feeders for municipal and state sanatoria and when properly conducted will be a most important factor in the combat against tuberculosis. In all such cases it is desirable to shift charity from abuse, and, it devolves upon the state to determine the financial condition of the applicant and also prevent destitution of the family while the "bread-winner" is incapacitated for work. It is also the duty of the State to suppress Quackery, for no class falls more readily a prey to unscrupulous monte-banks, than our consumptives.

The Federal Government is already performing an important duty by exercising a watchful care over the subject of tuberculosis among animals. The preventive measures urged by the Bureau of Animal Industry are of far reaching significance although primarily intended to protect the pocket book of our Farmers and Stockraisers.

In view of the great economic importance of Tuberculosis it may be a pertinent question, why the Federal Government does not contribute more to the extermination of this disease. Large sums are annually and very properly expended to quarantine our Seaports against cholera, yellow-fever and small pox because these diseases if permitted to gain a foothold, occur in epidemics, are rapidly fatal and hence strike terror into a community, and yet practically nothing is done in the study or prevention of consumption which claims more victims than all these diseases combined.

In the opinion of the writer it would be extremely interesting and important to determine for example in the Pharmacological Laboratory of the Bureau of Public Health, the effect of pure and impure alcohol upon animal tis-

sues, with special reference as predisposing factors to Tuberculosis and Pneumonia.

In the actual care and treatment we also have a right to expect a more active participation on the part of the Federal Government. It is a notorious fact, that thousands of hopeless cases of consumption are annually dumped upon our States and Territories, which have become famed as health resorts, and the hospitals, sanatoria and alms-houses of the Carolinas, California, Colorado, Arizona, and New México are filled with indigent dying consumptives.

It is claimed by Mr. Frank D. Witherbee, in Charities, Nov. 6th 1904, that in Phoenix, Arizona, Public and private charity is taxed to the uttermost and that $\frac{4}{5}$ of the money expended on the inmates of the alms-house goes to alien consumptives.

It is cruel and worse than useless to send a consumptive away from home without sufficient means to secure the ordinary comforts and advantages of climatic treatment, and the Federal Government should not tolerate it, but until this is accomplished representatives of the Public Health and Marine Hospital should visit such places as Phoenix and other health resorts in Arizona and New México for the study of the sociological conditions of the consumptives, which studies may form the basis for a more permanent and enlightened amelioration of this unfortunate class of victims.

It is very evident that the great problem which confronts most of our Sanatoria today is, what shall be done with the class of indigent patients whose disease has been arrested, but who need suitable employment and surroundings for their permanent recovery. While it is hoped that the opportunities of a co-operative system will broaden out in time in connection with State Sanatoria, it cannot be denied that New Mexico and Arizona, with their

abundance of sunshine offer special advantages for a permanent cure, and the question arises, whether the Federal Government would not be justified in engaging in extensive Live Stock Raising and employ young men of this class to do the work. The Government needs horses and mules, beef and mutton, butter and dairy products for the public services. It has many valuable Reservations susceptible of cultivation with or without reclamation, and there is no good reason why such Government Farms should not prove self-supporting and a very important factor in the extermination of the disease.

The results of the Government Sanatoria for Consumptives at Fort Bayard, and Fort Staunton, N. M. have been so gratifying, that substantial and permanent results may be hoped for from an expansion of the system, along the lines indicated or by the establishment of colonies for consumptives under the fostering care of the Federal Government.

In conclusion I heartily endorse Dr. Knopf's recommendation that the United States Government should, after the example of Great Britain, France and Germany appoint a special commission "composed of expert sanitarians, physicians and veterinarians who should unite with the State and Municipal sanitary authorities of the country in the combat of tuberculosis in all its forms among man and beast."

Such a commission need not entail any great expense as the Government is already well supplied with experts in the various Public Services, and all that seems necessary is to grant legislative authority to bring about the desired result.

DISTURBANCES

OF METABOLISM AND WHAT IT MEANS TO THE BREAST FED
INFANT. LOUIS FISCHER, M. D. NEW YORK.

Attending Physician to the Willard Parker & River-
side Hospitals, etc.

Disturbances of metabolism, are seen by noting the character of quality of the stool. Digestion if perfect yields a soft homogenous mass of yellowish color. When metabolism is not properly performed there will be a dry hard scybalous mass. In other cases with disturbances such as intestinal indigestion the stool will be filled with air bubbles due to fermentative processes chiefly found in the colon.

Other evidences of intestinal indigestion can be seen in the form of white cheesy curds in the stool. When such masses are passed it is very evident that the constitution is being robbed of bone forming and muscle building elements. We are not surprised therefore to find that when such conditions are allowed to continue, that soft bones and flabby muscles yield a defective organism in which

backward teething, or decayed teeth complete the picture which we call rickets.

One of the earliest symptoms of rickets is restlessness at night, which if continued is indicative of gastroenteric disturbance.

Headsweating which is seen during nursing is another symptom that requires careful consideration.

Rolling of the head on the pillow will in time produce baldness of the occiput, which is another early symptom of rickets. I have seen baldness of the occiput as early as the third month. In some cases an infant may be nine months old before this symptom is seen.

WEIGHT. An important guide to the development of an infant is its weight. I insist on weighing every child once a week. This will be an important guide as to the real progress made in the assimilation of the food. When the weight remains stationary than some disturbance exists.

CHEMICAL ANALYSIS OF BREAST-MILK. When a breast fed infant shows no gain in weight or any other symptom above enumerated, the wisest plan is to submit a liberal sample of the breast milk of the mother to a chemist for examination. In this manner we can determine which ingredient is at fault. This has an important bearing on the diet which is required for the mother during the nursing period. When menstruation appears regularly during the nursing period, it is wise to make a chemical examination of the milk at more frequent intervals, for frequently the appearance of menstruation is a forerunner of the cessation of the lacteal supply.

RHACHITIS. When this condition is met with we ask ourselves, could this disorder have been prevented? To this we answer; that under certain conditions rickets could have been prevented.

Breast-feeding and Rickets. It must not be assumed that because an infant is fed from the human breast that all must go well.

DISTURBANCES OF LACTATION. A very nervous mother will usually overfeed in her anxiety to strengthen her infant.

If the baby cries and the mother is young and inexperienced she will try to quiet the baby by nursing it, and nursing it whenever it cries. In this manner the interval of feeding is not taken into account and overfeeding results,

Lack of Exercise. A nervous mother usually stays indoors owing to her anxiety regarding the baby and thus deprives herself of much needed exercise.

Lack of Appetite. By lack of exercise she will not only lose her appetite but secrete milk that is sadly deficient in fat and frequently deficient also in proteids.

Lack of Sleep. A nervous mother usually robs herself of much needed rest and sleeps but very little.

Besides being frequently disturbed to nurse her infant, she will lose hours of sleep in supervising the infant's comfort. This sacrifice results in a deficient quantity as well as in a deficient quality of milk. The result is usually told by a deficiency in the weight and development of the child ending in rickets.

Early Symptoms of Rickets. One of the earliest symptoms of rickets in infancy is constipation. This point is important enough to emphasize. The correction of the same in nine cases out of ten consists in giving a drug such as calomel or cascara for its laxative effect. While such correctives may be useful to cleanse the intestinal from stagnant faeces they do not modify the cause of the constipation.

The treatment consists in removing the cause and in most cases this will be found possible by changing the component parts of the food until proper metabolism is established.

Can the ingredients in human milk be changed? They certainly can. If the proteids are too high we can insist on active exercise such as walking, or if the mother remains indoors on account of inclement weather then exercise with light pulley weights will reduce the proteids.

If the proteids are too low the deficiency can be made up by leading a quiet life and then active exercise must be forbidden.

To reduce the fat we must decrease the amount of meat, and insist on a plain but nutritious diet.

An interesting case of marked gastric disturbance in an infant was reported to me by Prof. Lafayette Mendel of Yale University. An infant whose father was a physician showed marked symptoms of gastric disturbance. A sample of breast milk was obtained and sent to Prof. Mendel for a complete analysis. The milk contained 5.4 per cent. of fat. The young mother—a 'well fed' individual, indulged as young mothers are likely to be—was immediately put on a *low diet* with as much exercise as seemed proper. The child improved.

With an intelligent mother or a common sense wet nurse it is no difficult to change the ingredients of human milk. When there is a marked deficiency in the total quantity I usually insist on the mother drinking soup, broth, cocoa or gruel before each nursing. This usually stimulates the flow of milk.

To avoid disturbances of metabolism which will influence the quality of the milk of a nursing mother, we must insist in the beginning of the nursing period, in laying down positive rules. Such rules as pertain to the length of

time that the infant should be nursed, the interval between each nursing, and the necessity of observing the character of the stool of the infant, and its general appearance. Its sleep, its weight must all show natural tendencies.

The health of the mother is of prime importance. The physician must direct attention to the necessity of the mother observing strict dietetic rules. The mother must conform to the laws of nature and have sufficient exercise and sleep.

Her bowels require attention. If a woman is constipated, she requires a mild aperient. Water must be taken by a nursing mother frequently.

Regarding Alcohol. My rule has been to permit beer or wine if the same has been a former habit. On the other hand I persuade the nursing mother not to use alcoholic beverages be they wine beer or stout, but prefer to build scanty milk by means of the cereals, and the dairy products.

In rare cases the breast milk of the mother will be found to disagree with the infant. In such cases it will require changing to a wet nurse or to artificial feeding.

CONTRIBUCION

AL ESTUDIO DE LOS MEDIOS DE INTERVENCIÓN EN LOS CASOS DE PLACENTA PREVIA TOTAL

En ningún caso de parto anormal, está más en peligro la vida de dos seres, como en el de *placenta previa total*, y en ningún otro. tampoco, dependen más, estas dos existencias, de una intervención oportuna y rápida. "Debe pues el partero, estudiar minuciosamente cada caso particular, á fin de aplicarle el mejor medio de intervención que se adapte á sus circunstancias especiales, guardándose bien de una precipitación imprudente ó de una irresolución culpable." (Naegele & Grenser).

MEDIOS DE INTERVENCIÓN

El profesor Pinard, nuestro eminente maestro, ha dejado magistralmente establecido el modo de intervenir en los casos de insercion de la placenta en el segmento inferior (ruptura de las membranas): pero, en los casos, afortunadamente raros, de verdadera placenta previa, es decir, cuando la placenta y el segmento inferior, se corresponden *centro por centro*, lo que Demelen ha llamado *placenta previa*

total ó completa; el método de Pinard resulta impracticable, aun cuando el cuello esté bastante dilatado. El dedo, en efecto, no alcanza el borde de la placenta, máxime si es voluminosa, sino que tropieza con los cotiledones, por más esfuerzos que se hagan, y estos desprendimientos parciales, que necesariamente se multiplican, buscando un punto vulnerable predisponen á la infección, aumentan la hemorragia y por consiguiente el peligro.

Mayores riesgos presenta aún (por la hemorragia que produce) el procedimiento consistente en desprender una parte de la placenta y extraer el feto, según la presentación, por la versión, por el forceps, el basiotribo, &c. Cada una de estas operaciones, por hábil que sea el operador, requiere un tiempo largo, durante el cual, no solamente sigue la hemorragia, sino que se aumenta, por las mismas maniobras operatorias que necesariamente actúan de continuo sobre el desprendimiento placentario.

¿Cómo intervenir pues, en un caso de *placenta previa total*, cuando el cuello esté suficientemente dilatado ó dilatable ?

OBSERVACION

El 30 de Septiembre de 1899 fuimos llamados, por nuestro estimado colega el Dr. Coiscou, para ver á la señora Emma M. de 28 años, quien había llegado al término de su segundo embarazo, y cuyo estado era alarmante. El primero había sido completamente normal y terminó el 9 de Noviembre de 1897 por un parto dilatado, en el cual no hubo asistencia médica y apareció la criatura.

En el curso del actual embarazo, ningún accidente se había presentado hasta los seis meses y medio; pero de esta fecha en adelante, ocurrieron frecuentes hemorragias que obligaron á la paciente á guardar cama, durante los dos últimos meses y que fueron tratadas por irrigaciones de agua caliente y taponamientos.

En la mañana del día anterior á nuestra visita, habían principiado los dolores, y junto con ellos se presentó una gran hemorragia que pudo cohibirse, momentáneamente, con un fuerte taponamiento; pero que reaparecía á medida que aumentaban las contracciones. El Dr. Coiscou había comprobado la inserción de la placenta en el segmento inferior é intentando, varias veces romper las membranas; el dedo no alcanzaba el borde de la placenta, y cada nueva tentativa, produciendo mayor desprendimiento, aumentaba el derrame.

En el examen local que practicamos junto con nuestro distinguido colega y amigo el Dr. Gautier, llamado también en consulta, encontramos una dilatación de seis centímetros más ó menos, ocupada completamente por los cotiledones; pero en las respectivas tentativas que hicieramos entonces, de romper las membranas, no fuimos más afortunados que lo había sido, la víspera, nuestro compañero Coiscou.

Entre tanto, la paciente desfallecía, el pulso pequeño y frecuente, llegó á veces, á ser filiforme, la vista se nublaba y el rostro se cubría de sudores fríos. Los movimientos activos y los ruidos del corazón del feto habían desaparecido desde esa misma mañana.

Presenciamos un caso de *placenta previa total*, en que se trataba de salvar á la madre, cuya vida estaba ya muy comprometida. Ante situación tan angustiosa, recordamos que algunos parteros han señalado casos semejantes, terminados por expulsión espontánea de la placenta antes del feto, salvándose la madre: y aunque penetrados de que el medio de intervención que nos sugería aquel recuerdo, había tedido sus opositores, nos pareció sin embargo, el único que podía, en aquel caso especial, brindar á la pobre señora una esperanza de salvación.

Propusimos resueltamente, á nuestros compañeros, el desprendimiento total y extracción de la placenta, antes del feto.

Lo llevamos á cabo rápidamente, y si bien el derrame excedió un poco, al que generalmente se observa cuando la inserción se hace en el segmento superior, pronto y completamente. La presentación era de vértices, hicimos una aplicación de forceps, y en las primeras tracciones se produjo la procidencia de un brazo; desarticulado y sacado el instrumento, redujimos la procidencia y después de una nueva aplicación, se extrajo la criatura, sin que durante todo ese tiempo, hubiera la más leve pérdida de sangre. Mientras duró la intervención se aplicaron inyecciones de cafeína, de ether y de suero artificial (agua salada al siete mil % (7.000%).

A los veinte días, nuestra operada dejaba la cama, sin haber tenido durante ese tiempo el menor accidente; la hemos vuelto á ver en diferentes ocasiones; tiene tres niños, sus partos han sido todos, completamente normales y en la actualidad está en cinta de ocho meses.

CONCLUSIONES

El detenido estudio de la anterior observación, nos induce á creer, que en el caso de *placenta previa total*, en que se trate de salvar á la madre; el mejor medio de intervención, cuando la dilatación sea suficiente, es el desprendimiento total y extracción de la placenta, antes del feto; cualquiera que sea la presentación.

No dudamos que este procedimiento, llevado á cabo oportunamente, por manos hábiles y experimentadas, contribuya á salvar también la vida del feto, sobre todo en las diferentes variedades de la presentación de pelvis.

Santo Domingo, 14 de Diciembre de 1904.

RAMÓN BAEZ.

Dr. en Medicina de la Facultad de París.

A STUDY

OF STOMACH DILATATION TREATED WITHOUT OPERATION
AND RESULTS IN 60 CASES. BY JAMES G. HUMFORD, M. D.
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SSACHUSETTS GENERAL HOSPITAL.

I propose to tell of 60 cases of gastrictasis treated in the Medical Wards of the Massachusetts General Hospital in the years 1838 to 1903, and of the end results which it has been possible to obtain. In the list those cases are not included in which definite diagnoses of organic disease were made.

The cases here described were chronic dyspeptics who had suffered anywhere from a year to a life-time and were admitted to the hospital wards for treatment. They are listed in the hospital under "Dilatation of the Stomach" because no more accurate diagnosis was made. Why in the light of subsequent investigations some of these cases were not more carefully analysed it is hard to see.

There are recognized by clinicians a male and a female type of dilatation; the male type is more likely to be a great lateral dilatation, discovered by tympany above the

umbilicus, extending beneath the ribs upon the left and pushing up the diaphragm. This type is frequently seen among alcoholics in dispensary practice, and is usually successfully treated in outpatient departments. It is not to this alcoholic type that I refer; indeed, of the 41 male cases to be described 6 only could in any sense be called alcoholics.

The female type of dilatation is the long stomach distended towards the pubes, usually associated with gastropnoxis, though a prolapsed stomach is not necessarily always dilated. We used to regard very many of these cases as atonic and doubtless many of them are so; but, in the experience of the Massachusetts General Hospital, the majority of atonic cases, if curable or susceptible of relief, find their benefit in the Out-Patient Department and are not met with in the Hospital wards.

There were listed in the index catalogue of the Hospital, in those 15 years, 117 cases of "Dilatation Stomach." Sixty of those cases have been traced;—a little more than 50%; of the 57 untraced cases it is probable that many are dead. Certainly dead men are less easily discovered than the living.

A passing word about those 57 lost cases. We have a record of their condition when they left the Hospital: 1 was "well"; 16 were "much improved", 27 were "improved"; 8 were "slightly improved"; 5 were "not improved."

Of these 57 cases, 42 were males and 15 were females. The average age of the males was 46.5 years; the average age of the women 42.6 years; not that there is any special interest or significance in these figures, except that they will be found to correspond later with those of the patients who have been traced. The records show that when those traced cases left the hospital there were 2 well; 2 unimproved and 47 improved; nine died in the hospital. At the time of my investigation the report is as follows:

In 60 cases traced: well 7; unimproved 19; improved 5; dead 29.

This is not an encouraging showing; let us consider however, some of the facts and figures in detail and learn what we may of this interesting but unclassified group.

In the first place it is striking that of the 60 cases, 41 were *male* and 19 were *female*; while at the same time the Hospital records show that during that period of 15 years the total female entries of all classes of cases somewhat exceeded the male entries. The explanation for the reversal of figures in the cases under consideration probably lies in the fact that the majority of women with stomach disease who entered the Hospital were found to have clear histories of gastric ulcer and were listed under that heading.

The *ages* of the men varied greatly; the youngest was 27, the eldest was 64 and the average age was 47 years. The youngest woman who entered was 22 years, the eldest was 69, and average being 40.3. These figures correspond closely to those usually given and when we come to study diagnosis it will appear that cancer, when the patients were admitted, was less commonly seen among the women than among the men.

The *duration of symptoms* in both sexes varied all the way from 12 months to 40 years.

As one would expect, the *loss of weight* varied greatly, though the records do not always state the exact figures. The variation however, runs from zero up to loss of 100 pounds, and seems to be of no special value in throwing light on a more refined diagnosis.

Pain was an almost constant symptom in these 60 cases: 5 only of the patients were without it. It is variously described as coming on immediately after eating, several hours after eating, relieved by eating to return later

and sometimes as being constantly present. As one would expect, when there was pyloric obstruction, *late* pain was much the most common. It is described as a burning, gnawing, throbbing, dull and boring pain; and many persons are found in the class who complain of constant pain. In all the cases it appears that the pain was relieved by vomiting.

Vomiting was present in 57 of the 60 cases. Two of the cases complained of vomiting in the absence of pain, but in no case were both pain and vomiting absent. The vomitus varied of course, in amount; and one reads of belchings, spittings up, vomiting the last meal taken, or vomiting enormous amounts typical of cases of great dilatation.

Fifteen, or a quarter of the sixty cases, gave a history which might suggest that there had been at sometime a distinct *haemorrhage* from the stomach; only three however, gave a clear history of frequent vomiting of blood. One case also passed stools suggestive of gastric or duodenal ulcer. A consideration of this one symptom of haemorrhage alone shows that a considerable number of these cases of gastric dilatation would undoubtedly today be further analysed and put into the group of cases in which the dilatation was due either to ulcer or malignant disease.

The *analyses* of gastric contents as given in the records are not satisfactory. Indeed, one would scarcely expect satisfactory accounts, from our present point of view, in cases running back 10 or 15 years. As we come down towards the present date however, the analyses are found more accurate, but apparently no more final for the establishment of diagnosis. This criticism of the records is equally true of all manner of cases recorded in former years, and the very fact that in all departments of clinical research our present observations are better than those former ones, indicates merely the gratifying fact that we

know more than we used to know. The sings "splashing" and "visible peristalsis" are seldom recorded in the early records, although they must have existed. Their significance was apparently disregarded or over looked.

The *treatment* of all these cases need not be entered into at length; it was what the physical examination and analyses obviously suggested. The patients were put to bed and lavage was very commonly employed, being used in 44 out of the 60 cases. Most of the individuals were given such tonics as Nux Vomica, Capsicum, light wines, strychnine and iron. In suitable cases a full diet was employed, in others a dry nitrogenous diet and in others still a liquid diet. It is interesting to note that all the 60 cases 5 only were given HCL regularly and 2 only were fed upon nutrient enemata.

In all these cases cathartics were employed, such as carlsbad salts, aloes, strychnine, belladonna, cascara.

Such in very brief out-line is a summary of my notes upon the 60 cases as a whole. Let us now consider in more detail those cases which died or recovered, and see if in any way such facts as we have are significant.

Seven cases recovered and after several years report themselves as well; 2 of them are woman, 5 are men. The first and most striking fact about all these is that the recoveries took place in persons in middle life who had been many years dyspeptics, their periods of invalidism running from 5 to 40 years individually, an important fact for the consideration of those enthusiasts who are urging indiscriminate and immediate operations on all cases of chronic dyspepsia.

The Dead: Of the 60 cases, 29 (48.3%) are reported dead and the causes of this large number of deaths are the subject of most serious importance in this inquiry. We are constantly being told, and with great show of rea-

son, that the greatest danger of long continued stomach disease, after early life, is cancer; the probability* of malignant disease developing on the site of ulcer. After much careful inquiry it appears that in 15 or over 50 per cent of these 29 deaths cancer was assigned as the cause of death. Our figures are suggestive either way but prove nothing either way. Of the 15 deaths from cancer, 6 followed a history of many years invalidism. These *six* patients had had stomach symptoms for 5, 7, 9, 10, 12, 20, and "many" years; they sought relief at the Hospital as a last resort and most of them died a few months after their entrance. The probability, of course, is that the above stated contention is sound and that in these cases cancer had been implanted upon long standing non-malignant disease.

In the remaining 9 cases of death from cancer, the disease ran a short course from the initial symptoms, to the end: the average duration being 17 months. The shortest case is recorded as 4 months in all, and the longest as 39 months. These figures dealing with the duration of cancer correspond fairly well with those of Von Mikulicz, Moynihan and other writers.

The causes of death in the remaining 14 persons, of whom cancer is not reported, are starvation; although for a certain proportion one suspects cancer, the presence of which was not disproved from lack of autopsy.

For the cancer cases one final note is interesting; namely, that with 2 exceptions all died within 9 months after leaving the Hospital, no matter what the duration of the disease may have been before entrance. The 2 exceptions must have developed their cancers after they left the Hospital. For their deaths are recorded in 3 years and 5 years subsequent to the date of Hospital discharge.

Of the 14 cases against whom the diagnosis of cancer cannot be written, 11 died within a year after leaving the Hospital. Lack of proper returns and autopsy records

leave us without definite conclusions in these cases, but we must assume that with many of them cancer was the cause of death. Eleven of these cases were of short duration after their discharge and had been ill previously for periods varying from four months to twenty three years.

Three of the non-malignant cases lived six, five and six years after their discharge, and died eventually of "stomach trouble."

To put our facts in other words: of the *twenty-nine* fatal cases, twenty were short cases, ill but a few months before entering the Hospital and dead a few months after leaving. Nine were *long* cases; and of the *long* cases four died of cancer soon after coming under observation; two died of cancer several years after being studied at the Hospital; and three died of wasting gastric disease other than cancer. (?)

The figures may be juggled in many another interesting fashion, but nothing is proved beyond the first obvious fact, that nearly 50 percent of these cases of gastrectasis died, and that about half the deaths were due to cancer. These cases speak eloquently as to the difficulties to be encountered even in hospital work of making a full and accurate diagnosis.

Nineteen of our cases have been found worse or *unimproved* since leaving the Hospital, and many of them are so seriously ill that we must expect them shortly to be ranked with the dead; 11 of them are men and 9 of them are women. Their ages are unimportant but we must note that they averaged at entrance 43 years; the youngest being a man of 28, the eldest a man of 64. And the duration of their invalidism varies all the way from 1 year to 28 years, the average being 10.7 years. Most of them however, give histories of long continued dyspepsia, either before entering or since leaving the Hospital, so that it is fair to state that in a very few, if any, of these cases are we at present

dealing with malignant disease. The essential symptoms have been epigastric pain after eating, which is present in all of the 19, and occasional vomiting, which is present in 17 of the 19.

The symptom of ancient haemorrhage has been present in but 6 of the cases and such haemorrhages were so long ago recorded that a positive diagnosis of gastric ulcer cannot very well be made. The presence or absence of HCL in these cases is interesting. It was present in 16 of the cases and persistently absent in 3; yet those 3 cases obviously had no cancer, for they have continued living on feebly for 9 and 10 years since leaving the Hospital, indeed one of them has been an invalid 15 years, the second 33 years, and the third 34 years. In all of the 19 unimproved cases there was greatly delayed motility with a gastric capacity considerably increased. They have gone on living many years since leaving the Hospital, but all are hopeless invalids, dependant on others for their support. It is a depressing series of biographies.

Five cases of our 60 are reported as "*Improved*". Though not to be placed in the class "*well*" they approximate that class, and may be considered in the same connection. Two were females and 3 were males and their ages vary widely; the youngest being a woman of 22, the eldest being a woman of 54, at entrance:

Taking these five cases in some detail we note that.

Case 1. Was 54 years old at her entrance, 15 years ago, and is now fairly comfortable at the age of 69. She had been ill 21 years when first seen at the Hospital, so that now, in her old age, she has been a dyspeptic for 36 years. Her symptoms have been occasional epigastric pain after eating, and occasional vomiting. It is recorded that some 20 years ago she vomited blood twice, and the presumption is that she has a slight pyloric obstruction due to a healed ulcer. At the Hospital the stomach contents

contained free HCL. She was treated by lavage, cathartics, tonics and nutrient enemata, and be it noted that this case and the next are the only ones in our list of 60 of whom it is recorded that they were treated by nutrient enemata. This patient continues the use of the stomach-tube at home and enjoys a fairly comfortable existence. A good example of what may be expected in moderate stenosis of the pylorus under fairly favorable circumstances.

Case 2. Was a man 39 years old who had been acutely dyspeptic for one year. He too had had and has epigastric pain, occasional vomiting and has a record of one haemorrhage about nine years ago, before entrance, and he too doubtless has a slight pyloric obstruction due to a healed ulcer. No free HCL was found present; there was abdominal splashing and he was treated by lavage, was given HCL and fed by nutrient enemata. He reports himself as fairly comfortable.

Case 3. Was a young woman of 22 who had been a dyspeptic for 18 months, with epigastric pain several hours after eating and occasional attacks of vomiting. At one time, shortly before entrance, she vomited blood; HCL was present; she was treated by lavage, was discharged after 2 weeks and reports herself as fairly comfortable so long as she uses the stomach tube.

Case 4. Was a man of 39 who had had symptoms for 12 years. Now, 14 years since his discharge, he looks back on 26 years of dyspepsia. He is thin, 20 pounds below his normal, with occasional attacks of pain and vomiting; HCL was present in his case; he was treated and continues to treat himself by lavage.

Case 5, a man of 52 at entrance, had symptoms of comparatively short duration, 3 years before entrance and 2 years since. He has lost 30 pounds in weight and has the usual symptoms of occasional vomiting; HCL was present.

in his case and he continues fairly comfortable with the use of lavage.

All of the above 5 cases had dilatation of moderate extent with a gastric capacity ranging from 40 to 80 ounces, and delayed motility; indeed, except for the disparity in age they seem quite similar.

The apparent lesson to be drawn from this little group this is, that patients with mild degrees of dyspepsia in whom there are healed ulcers with some pyloric obstruction, may be kept fairly comfortable by the continued use of lavage, which prevents accumulations, and consequent fermentation, but cannot be made completely well while the obstruction, mechanical or functional with its consequent dilatation and malnutrition, persists. We must not forget moreover that such an existence to many persons is preferable to the thought of undergoing an operation.

The *Well*: As with the class of "improved," the "well" occupy but a small space in our list. Seven persons of 60 report themselves well. When we come to study the figures we find little that is significant. The ages of the patients on entrance varied from 29 to 57; five of them were men, two were women; and while the two women had been ill twenty and fifteen years, respectively, the men had been ill for 6 months to 40 years; in no case was there a striking loss of weight, except in that of a man of 42 who had lost 40 pounds. In brief detail the records are as follows:

Case 1. Was a man of 57, who had been ill 40 years and had lost 5 pounds; he was a carpenter and there was some suspicion of lead colic about him; during this long period he had had frequent attacks of gnawing epigastric pain relieved by food; some times vomiting would relieve the pain, and he had vomited as much as 2 quarts at a time; he was constipated and flatulent, he was thin and neurotic. The lower border of his stomach was 4 inches below the

umbilicus, there was a residue of 8 ounces, thin undigested food, not foul; there was abundance of free HCL and no lactic acid. The man was put on a dry nitrogenous diet with bicarbonate of soda, iron, and gentian; after 6 weeks he was discharged well.

For the past 9 years he has remained well. This may be a case that illustrated how surgeons most not fail to diagnosticate the gastric crises of lead colic.

Case 2. Was that of a man very different from the last; he was 35 years old and had had symptoms for 3 years only. At the Hospital they thought he might have cancer, but that was 11 years ago and he is still living. For three years he had had debility, poor appetite and epigastric pain coming on half an hour after food. He was an emaciated man and there was abdominal splashing. At the Hospital they fed him up and gave him HCL. His stomach was dilated to the umbilicus. In 2 weeks he went home well. He has been well ever since.

Case 3. Was a good deal more serious; it was that of a man 42 years old, whose stomach reached 3 inches below the umbilicus with a capacity of 60 oz.; HCL was present and no lactic acid. For many years he had had occasional vomiting of about 50 ounces at a time. He had lost 40 pounds. At the Hospital they washed him out and fed him up, and at the end of 2 weeks he went home, taking with him a stomach tube, since unused. That was 6 years ago and he has been well ever since.

Case 4. Was that of an emaciated middle aged man who had been vomiting occasionally for 10 years, and usually at mid-night; he used quite frequently to have pain after food, there was some ptosis of the stomach and the dilatation extended 4 inches below the umbilicus. A residuum of 5 oz. was expressed and much free HCL was present, as well as Butyric and Lactic Acids.

It is evident, from the tone of the record, that this was regarded as a rather ugly case; but they gave him Carlsbad salts: washed his stomach out, sent him home with a tube and he has been well ever since. That was four years ago.

Case 5. Also looked unpromising; it was that of a man 44 years old, who had epigastric burning, and dull aching two or three hours after food for many years. He had lost 12 pounds. The pain was evidently relieved by food, but came on again later, and often he used to vomit up a pint or more. He too, had ptosis of the stomach and splashing, with the greater curvature 2 inches below the umbilicus. His gastric capacity was 53 ounces and free HCL was present.

They gave him a milk diet, salts, bismuth and bicarbonate of soda, with dayly lavage. He went home well and is well to day after 4 years.

Case 6. Was that of a young woman 29 years old, who had been a dyspeptic for 20 years, and had vomited mucus and food at varying intervals during that period. There had never been any significant pain, but she was emaciated, with a stomach 4 inches below the umbilicus; without HCL and with lactic acid present.

She was put on a full diet, after 3 days of which HCL was found. After 3 days of such treatment, and with lavage, she left the Hospital with a stomach tube and sightly relieved.

Here's a quotation from her letter written 12 years after leaving the Hospital. It is instructive and somewhat entertaining:—"All of the symtoms returned after leaving the Hospital and for three or four years I was very ill indeed and finally was persuaded to go to Dr. F—; after treating me for about 10 months he succeeded in curing me almost steadily since (*sic*, for 8 years!).

"Dr. F—does not believe in washing the stomach. I am sure that the thing which did me the most good was teaching me how to live. I can now eat almost anything and, unless I am indiscrete, rarely have return of the old trouble."

Case 7. Was that of a widow of 38, with a history of 15 years dyspepsia. The record notes the fact that she was a neurasthenic with a slightly dilated stomach. During these 15 years she had had occasional attacks of vomiting, but no haematemesis; she was constipated, thin and excitable; she spent 3 weeks in the Hospital being fed up, and being given tonics. Then she was discharged "relieved." A month later she reentered the Hospital to stay there 2 months under the same treatment, and was then discharged well. She had no gastric lavage.

Eleven years have elapsed and she reports herself in excellent health.

Of these 7 persons who have recovered and have remained well there is nothing especially to distinguish them from the persons who died or the persons who continue dyspeptics. All appeared unfavorable cases for treatment, none of the 7 had haemorrhages, 6 had vomiting; and in every case there was either vomiting or pain or both; each one had a dilated stomach. They are shining examples of what may be done "medically" with the most unpromising cases.

In this "well" class again the investigation of gastric contents determined nothing except that delayed motility was shown; 4 cases had HCL, 3 of them had it not; 2 of the cases showed lactic acid and 5 of them showed none; 4 of the cases, those with most considerable dilatation, were treated by lavage; 3 of them, those with slight dilatation and of the neurasthenic type, were not so treated. All of the cases were in middle age or just about entering upon

that period of life; and all of them are still living, well advanced in middle age or old age.

Just what may be the cause of dilatation in these "well" cases is not appertent, but certain it is that they have been fortunate enough to pass through long periods of gastric disease without developing cancer and that they are now well:—these 7 out of 60.

In resumé I may say, as I have already stated, that I have been considering a series of cases in which the diagnosis has been made of a prominent symptom which has several important etiological causes. For one reason or other best know to the clinicians under whose eyes these cases came during the past fifteen years, no definite attempt was made to separate these cases into their etiological groups for diagnostic purposes. This is not surprising when we remember the general disfavor with which dyspeptics have been treated in year past—they have received scant attention in too many instances. In the light of our present enthusiasm for stomach work it seems more than probable that this diagnosis—gastrectasis—would not be the only one made today in many of my cases. The series shows distinctly that a goodly number would be considered as of mechanical obstruction probably of benign origin. The difficulties in the way of diagnosis are illustrated by the resulting cures in some of the most unfavorable cases, and in the rapidly following deaths in others presenting the mildest symptoms, as well as symptoms of the shortest duration. It must, however, be held firmly in mind that while many of our present diagnostic procedures have been known for years past, their complete application in a practical logical manner, has been a matter of only a few years standing. The surgeon who is given to criticising medical diagnosis and treatment should remember also that he must be as lenient in his judgement of the past medical diagnosis and treatment as he desires internists

to be when he ask them to blot out from their remembrance the statistics of all gastric surgery done before the year 1904. Certainly a number of the above cases of dilatation would apparently have been benefited by an operation for the relief of the mechanical obstructions which evidently gave rise to the symptoms, and the point is to be insisted upon that after all possible attempts have been made to reach a clear understanding of the causes of gastricstasis, and after the adoption of suitable therapeutic measures without beneficial results, then operative measures are to be considered and a surgical consultation called.

ETHYL CHLORIDE

IN THE TREATMENT OF HERPES ZOSTER BY HOWARD MORROW D. M. SAN FRANCISCO.

For the many skin affections for which we are unable to give much relief, zoster occasionally is an excellent example.

Ordinarily it is a very mild condition for which the physician can make the patient quite comfortable, but frequently zoster produces more discomfort and pain than can be tolerated by the patient. The pain necessitating blistering, morphine injections, etc. In the milder cases the vesicles should be protected from the friction of the clothing by covering them with dusting powder, such as starch and oxide of zinc, to which camphor or morphine may be added. Although ointments tend to produce rupture of the vesicles, a condition not to be desired, nevertheless oily applications such as zinc oxide one part to three parts of carron oil, give a great deal of relief, particularly during the crusting stage. Menthol may be added to this when necessary. Internal remedies given with a view of aborting the eruption are of doubtful

value. In the severer cases antipyrin in large doses and given regularly occasionally gives some relief. Mild galvanic currents give most benefit for the neuralgia that so frequently follows the eruption. For the agonizing pain which often accompanies the eruption subcutaneous injections of morphine given over the nerve act well but possess many disadvantages. Counter irritation has long been used to overcome the severe pains of zoster, and as an example ethyl chloride acts excellently. Probably the action is more than a counter irritant but as to that I am not prepared to state.

Patients who have not slept for days and are in constant pain, can be greatly relieved by this treatment. An area the size of a dollar is frozen at a point where the nerve emerges from the spinal column. Although this usually relieves the pain along the entire nerve, it is better to freeze areas where the pain is localized. In some cases this treatment will relieve the pain for a day or more, whereas in others, only for a few hours. When this is the case there seems to be no objection to applying the ethyl chloride frequently.

I will report briefly on the following cases:

J. P. aged 60 years, had zoster of the third and fourth spinal areas, one group of vesicles was located anteriorly and another posteriorly, and the eruption was of three days duration. There was constant pain and insomnia from the beginning of the eruption, and the pain was localized to the two areas of vesicles. An area of skin between the posterior group of vesicles and the spinal column was frozen. That night the patient slept well, and this treatment greatly diminished the pain in the back, but only slightly decreased the pain in the anterior area. The following day both areas were frozen which relieved the pain and allowed the patient to continue with his work for the first time since the eruption appeared.

In November, 1903, a physician consulted me for pain accompanying intercostal zoster. The eruption was of 10 days duration. The patient had been unable to sleep during this time, and was unable to attend to his work. He had taken large doses of antipyrin and locally had used menthol cocaine and lead and opium without benefit. Ethyl Chloride was used to freeze an area the size of a dollar over the seventh nerve near the spine posterior to a large group of vesicles, where the pain was most severe. To the right of the sternum was another group also painful, and this area was also frozen. That night the patient slept well, and the following day he attended to his work with comparative comfort. With a recurrence of the pain these areas were again frozen. The patient carried a tube of ethyl chloride in his pocket for a week, and when the neuralgic pains recurred he immediately froze the painful areas. For several days he used this method, as often as four times in the twenty-four hours.

Under this treatment the doctor slept well and attended to this work regularly.

Paranoia as it relates to Homicide

READ AT THE PAN AMERICAN MEDICAL CONGRESS AT PANAMA JANUARY 1905. BY DR. JAMES W. PUTNAM, PROFESSOR OF NERVOUS DISEASES UNIVERSITY OF BUFFALO

There is no form of insanity which is of greater importance in criminal jurisprudence than paranoia. This statement is made because the paranoiac remains so often undiagnosed until some act of violence which results in the serious injury or death of this victim calls the attention of medical men to his case.

The examination of such criminals requires not only a painstaking study of the prisoner's history as it relates to his victim, but must include enquiry into his heredity, his youth, and, indeed, his whole life up to the time of the examination. The diagnosis of other types of insanity is comparatively easy. The recognition of paranoia is frequently extremely difficult, and oftentimes the demonstration of it, to the satisfaction of public judge and jury, is impossible, even in well marked cases.

Lest I should be accused of exaggeration I must call to your minds the case of Prendergast, the assassin of

Carter H. Harrison; the Mayor of Chicago, as recorded by A. M. Pannister.

“Prendergast was born in Ireland, and came to this country as a babe; his father was an inebriate, and several of his parental ancestors were insane. His mother was a strong woman, with no bad heredity that was ascertained.

In early childhood he sustained a head injury by falling that made him unconscious for several hours. This was followed by more or less headache. As a boy he showed peculiarities, was very irritable, and did not care for the companionship of other boys. He went to school for a few years; and made a very good progress. He became a newsboy and did quite as well as such boys generally do, but was rarely on good terms with the other boys. As he grew older he delivered daily papers on a some what secluded route, and did this work to the satisfaction of all. About the age of fifteen he began to develop delusions of persecution; thought the other newsboys were combined against him, that they were making misrepresentations about him, and that his mother and brother were also against him and constantly trying to do him harm. A little later than this there was much agitation in the Chicago papers about the dangers of railroad grade-crossings and the necessity of stopping the loss of life by track elevation. Then he became possessed of the delusion that he was God's appointed agent to bring about this important work. To do it, he conceived the idea that he must be made the Corporation Counsel of Chicago. As soon as Mayor Harrison was elected he applied to him. After Hon. A. Krauss had been appointed he called upon him and several times demanded the office as his, by right as the Almighty's agent. At the time of the assassination he went in the early evening to the Mayor's residence and made the

same demand. Being refused, he shot him, and immediately thereafter went to the police station and gave himself up. At this station he was regarded as insane and they at first determined to send him to the Detention Hospital for the Insane. At the police station Prendergast insisted that he did it; that he was the divinely appointed agent to elevate the railroad tracks, and in order to do it properly he must be Corporation Counsel. The Mayor refused to do it, and the Lord had commanded him to remove him. He seemed sorry enough, but said he must do as the Almighty demanded. In various interviews he always admitted the killing, and always justified it by his delusions; he seemed to be very sorry that it had to be done. Upon other topics he talked as well as could be expected with his limited education, showing a good memory, and emotional control. He had numerous stigmata of degeneracy. After two jury trials he was condemned and in due time hanged. No postmortem was permitted.

A definition of paranoia is essential as it has been frequently misapplied.

Paranoia, literally translated means, "close to understanding", the first term applied by Mendel is synonymous with the German *Primäre Verrücktheit*, the French *Delire Chronique a Evolution Systematique*, and with the English terms *monomania* and *chronic primary delusional insanity*.

It is almost unanimously conceded that paranoia is nearly always due to inherited structural weakness of the nervous system. In fact so strongly does Berkley of Johns Hopkins believe this, that he says, "For my own part I have never seen a paranoiac in whose case a full and complete history could be obtained that did not have an hereditary history of drunkenness, of family neuroses, or actual insanity."

With this strong position some able observers disagree, notably Mendel and Magnan. They maintain the only paranoia of early development should be considered as of the hereditary degenerative type; and that those who have reached middle life before the disease develops should be regarded as non-hereditary. The Italian school of Psychiatrists generally maintain that paranoia may be primary in some subjects and secondary in others; that when it is primary in an individual it succeeds a generalized insanity in his ancestors; when it is secondary, the insanity is confined to one individual. (Regis).

The American Psychiatrists generally are committed to the view that paranoia is a primary psychosis founded on an hereditary basis. It may first manifest itself in middle life under the influence of various causes. These may be slight and of short duration; serious mental shocks, or simply the long continued wear and tear of life; the battle against poverty and want; the stress of society; the complications of business domestic infelicity, and so on.

The development of paranoia is one cursed with neuropathic ancestry is gradual from earliest childhood. The future paranoiac is either above or below the average in the early accomplishments of talking; walking, the use of hands.

As the child passes into youth, physical peculiarities, which mark them from their fellows often become apparent. Mentally it is noted that they are either unusually seclusive, irritable, dreamy, and introspective. Although they are often studious they seldom are exact, so that their progress in science and mathematics is less satisfactory than in art, language and history.

When the duties and responsibilities of manhood and womanhood are assumed their inability to resist the strain of life's discipline is manifested in various ways

If plans fail, and endeavour does not meet with success, then the suspicions of the individual against others are aroused. Self is not blamed. The patient becomes more and more under this domination, until from suspicion the individual passes into systematized delusions of persecution, and keeps aloof from his friends from whom he conceals his delusions.

Hallucinations of hearing usually accompany the disease. The history of the paranoiac often includes the story of wandering from place to place to avoid the conspirators and vain attempts to escape from the persecuting voices.

Other patients are not secretive. They make confidants, and tell of their persecutions, and explain their strange behaviour.

Owing to the continuation of delusions and hallucinations for many years about one-third of the patients pass into a stage of grandeur. This stage is marked by delusions of changed personality. Because he is chosen for some great mission, he is persecuted and the conspirators are attempting to thwart him. In this stage environment, education and natural ability have much to do with the development of various types.

The politician believes in his call to power; the fact that he does not attain it laid at the door of the wicked, unpatriotic, or unappreciative. The disappointed inventor is possessed with the delusions that the patent office is in league against him. The religious enthusiast passes into a state of religious exultation and believes himself called upon to redeem mankind from the fetters of sin.

During all this time the paranoiac may retain his reasoning powers to a marked degree. He may engage in his business and attend to the daily routine of life, and

conversation on other topics is often well and logically sustained. Paralytic power with literary ability is not uncommon, this latter being well marked in Peterson's case, the author of "The Piling of Tophet." This book is an autobiography written by a paranoiac, who, previous to his admission to the hospital had attempted suicide with a revolver, and who also had delusions that the people of the village were acting upon him by magnetism, spoke disparagingly of him, and were conspirators against his peace. Of this autobiography, extracts of which appeared in the American Journal of Psychology 1889, Peterson said—"I believe no better idea of the typical form of paranoia can be obtained than by its reading."

It is the graphic picture of steady evolution of the malady, a remarkable self-dissection of the soul's anatomy. I must deny myself the pleasure of quoting more than the preface of this manuscript. It is sufficient to illustrate the literary ability of this paranoiac at a time when he was fully under the domination of his delusions.

"This work is given to the public as a lunatic's defense of his position. Every effort I have made hitherto to come to an understanding with my fellow-men, on things which I see to proceed from them, and which give my life its whole shape, has drawn out nothing more than blank denials of all knowledge of the things I spoke of. Now, it is impossible for me to reduce my thoughts to the bounds which others have been willing to concede. The object of this little autobiography is to show the form and consistency of the thought that is in my mind.

"I present my evidence to the tribunals of last resort, the public and the press, and ask them to try the case and render their verdict. Have I a right to my thought, or have I not? If not, where am I deceived? If I have, why is not mine the true thought of all men?"

From my own cases in medico-legal practice I have selected two paranoiacs indicted for murder in the first degree.

No. I. A boy aged 19, of good family, without previous quarrel, suddenly and without warning shot and killed a man in broad daylight, in a busy street. He was immediately seized and disarmed and taken to jail. The boy talked freely of the shooting and maintained that he was justified in doing so. That this man had frequently said to people that the boy was a bastard; that when he went away to a distant State and tried to obtain work at his trade it was refused him, and he knew at once the man had sent on word that the bastard was looking for a job. He went to a hotel in this strange city, and two of the waitresses laughed, and he knew at once that they did so because this man who was persecuting him had told them he was a bastard. He went to sleep in his room and he could hear different voices as they passed, saying, "The bastard is in there," and could hear them speak and call his mother, the mother of the bastard.

Of course, there was no arguing with the boy that his victim did not know these people and could not possibly have informed them. He was confident he had punished justly the defamer of his mother, and that he had done right.

He was angry at the thought that his lawyer should call him insane, and wished to be defended on the ground that he had done right, and that any right minded and right thinking man would have done as he did.

After three days of interviewing him and observations and taking testimony of his friends and neighbours, the experts for the people, Dr. Ford of Utica, and Dr. Mac Donald, of New York, and the writer, reported to the District Attorney that the prisoner was insane and that the trial should not go on.

A commission was appointed and the prisoner was declared insane and was sent to Mattewan, the institution for insane criminals of New York, where he has been for seven years.

The previous history of this boy was that of the average school boy. He was as good a pupil as most of his class. After leaving school he went into his father's store and learned the trade of watchmaker, and spent a large part of his time at work repairing watches.

Gradually it was noticed that he withdrew from social gatherings, that he would not talk with people, and that he spent much of his time by himself. In the last year before the shooting he made two trips away from home, saying that he did not wish to work there longer. He returned both times, saying that "they were against him."

In deciding that he was a paranoiac we came to the conclusion that he knew the general difference between right and wrong, and that he thoroughly understood the consequence of the act of murder. But that this particular murder he believed to be right.

When he was examined by the Commissioner and declared insane by them, he expressed himself as much disappointed; that as he had done right in killing this man he should be tried and justified. He had no fear of conviction.

I have heard of him from time to time since he has been at Mattewan. His delusions are the same. The statements are often repeated, that he did right, that he was glad he did it, and would always say so.

The other case of homicide by a paranoiac was studied by me as the chairman of a Lunacy Commission appointed by the court,

The facts were these:

The prisoner in July last had a slight argument with his employer, and suddenly, and without warning, stabbed him to death. He also stabbed a woman who tried to interfere. After the murder he disappeared and was not heard of for five months. He then returned, and meeting one of his friends, said he had come to get a job. He was arrested and committed to jail to await trial.

The fact that he returned, and his peculiar behaviour in the jail resulted in the appointment of a Lunacy Commission.

The prisoner was of good build and appearance. He presented none of the stigmata of degeneracy.

The history as given by him, and by persons who had known him was as follows;

He received an ordinary common school education. He never associated much with people, because he thought they laughed at him, and did not like him.

About five years ago when working for a farmer, a telephone was put into the house and his suspicions were aroused. He had less to do with his fellows, always preferring to be by himself. Suddenly he left his employer, without giving a reason other than the telephone messages. He went to Atlantic City, went from city to city along the coast down to Florida, working a short time in each place, and then suddenly leaving, without any other reason than the one that the telephones bothered him.

After continually changing his place of residence, he finally returned to his native town to seek employment. In this town he was hired on a farm, and did his work satisfactorily. He frequently complained to the housekeeper, that he did not like to have people talking about him and telephoning about him.

One day after a dispute about the time of milking, he announced his intentions to leave at once, and asked for his wages. In the discussion he attacked his employer, and killed him.

To me he explained his going away as having nothing to do with the crime; that he had planned to go before; that he had often been to Atlantic City that he went to get work, and to get away from the people who always telephoned about him. People always seemed to know who he was and what his business was. He came back after being away five months, because he did not know the man was dead. He did not know he was wanted. If he had been wanted, they knew by telephone just where he was all the time, and could get him at any time. So he came back and was going to work, when he was arrested.

This man knew murder was a crime, and was punishable by death. He was able to reason correctly about the gravity of his situation, and denied that he had killed him, but said he remembered striking him. He had thought of killing other employers and persons, just to stop the persecution by telephoning about him. He thought if he should kill some one it would be a lesson to others to stop the annoyance and the hounding. He justified himself by saying, "A man has a right to protect himself."

The more we study cases of paranoia, the more firmly must we be impressed with the dangerous possibilities of the disease. In discussing the best method of dealing with these patients we must remember that the first duty of the State is its own protection of its different communities, and that the verdict of "not guilty" because of insanity, does not mean liberty.

We must remember that although the idea goes forth that the insane man is not responsible for his crime, the

erroneous impression is abroad that the lunatic go "scot free." I cannot speak for every State, but certainly in the State of New York a verdict of "not guilty, because of insanity" in a case of murder is practically the same as a sentence for murder in the second degree,

The public must be educated to the fact, that the man does not get his liberty by the verdict of not guilty when rendered because of insanity, but on the contrary, the prisoner is taken into an institution where the Governor's pardon does not reach him, neither does he ever obtain release when the type of insanity is paranoia for paranoia is chronic and incurable, tending with the lapse of years to dementia.

In reference to this question, the late Dr. Eskridge, of Colorado wrote; "If the paranoiac who commits a crime in consequence of his delusions is not responsible, what shall be done with him?" Every State should have a criminal insane asylum, in which all the insane who have taken human life should be committed for the remainder of their lives. In the absence of a criminal insane asylum they should be imprisoned in a state penitentiary for the rest of their lives. This view in the most recent text-book on "Legal Medicine" shows how unsettled is the opinion of the medical profession on this point.

I, myself, can only subscribe to this doctrine of perpetual detention as it refers to the paranoiac.

CLIMATE AND TUBERCULOSIS.

BY **FREDERICK SOHON, M. D., OF WASHINGTON, D. C.**

A proper view of assistance in the cure of pulmonary tuberculosis by climatic aid is that it may favorably influence the course of the disease by securing a change in the existing cycle of faulty economic processes. A judicious change of climate may give immediate relief from some of the deleterious influences under which the disease was contracted and made headway. This relief in itself may favor a more harmonious relation among interdependent functions and so serve as a brake to stay a downward tendency and to give an impetus to the restoring of health. This turning toward proper physiological activity and the initial impulse toward the stifling of the disease will be the theme of the following.

When tuberculosis is contracted one has already descended preliminary steps in the scale of health, and it is unreasonable to hope that he will regain strength or free himself of the contagion among conditions under which he has succumbed. Nature must be forced to take up her own work in a system already below par, and she must be

given a fair chance to begin this work. To get decided results necessitates decisive steps, not necessarily involving a radical and permanent change of everything affecting business or social interests, place of life-long residence, etc., but decisive to the extent of obtaining a decided betterment from the conditions which favored the contraction of the disease. Among these conditions are climatic features which have much to do with the prevalence of tuberculosis in particular regions and they must be taken into account in seeking relief.

Climate itself is not a specific, but climatic conditions may be used as stimulating agents toward a cure.

In this chronic disease the body still retains some adaptability to environment, and such climatic items as altitude, temperature, relative humidity, etc. are secondary in importance to the getting rid of the influences which burdened the economy and they are only curative agents in so far as they meet special indications and change for the better some vicious element in individual cases. Therefore the question of a particular climate should be taken up as are therapeutic agents having indications, doses, and incompatibilities.

Thus in cases of a pronounced catarrhal type the poisonous exudations still further increase the bacillary fertility of the pulmonary tissues and the deterring factor can best be met and relieved by a dry and somewhat rarefied air. On the contrary a rarefied atmosphere may cause dyspnoea and pulmonary congestion when the respiratory capacity is much diminished. The transitory blood changes which occur at high altitudes may be of immediate service to anaemic patients, while to the sedentary, and to those in whom the infection was planted when they were debilitated by other diseases, the stimulation and tone of a mountain life might also be beneficial. On the contrary those of a nervous temperament are not fit for

high altitudes or other places where exertion and excitement are incessant and the liability to hemorrhage is increased by going to such places. Cases in which the dominant trait is exhaustion may do nicely anywhere in a calm country life or at the sea shore, and receive there an impetus toward health even though conveniences and other desirable factors may not be as favorable as at home. When there is a rheumatic or other constitutional taint to drag down the general health the cure should not be risked in localities subject to dampness, storms, or other influences which tend to light up the underlying dyscrasia. One whose pulmonary resistance has given way under the constant irritation of a dust-laden air would be advantageously placed if saved this irritation and the resulting waste of nerve strength by a sea trip or by going where dust is diminished by a snow covered ground or even by frequent rains.

Such indications as the above are strikingly applicable when detailed, but they are too often neglected and the selection of a desirable climate treated in a routine manner.

Above all else it is not well to consider too prominently the fact that the lung is diseased; there must be a weighing of the individual tendencies and of the personal equation in the consideration of a change of climate.

It is perhaps needless to remark that cases in the advanced stages of the disease are not referred to in the foregoing. When aids which one might have tipped the balance have been neglected, or were not obtainable, the consumptive will most often have a smoother, if not a longer life by remaining in his own home.

When considered along these lines special climates do not possess the specific importance heretofore ascribed to them, but although patients can get well almost anywhere there is the greater possibility that they might not. There exists a general appreciation of the importance of checking

tuberculosis in the early stages when there is less to cure and a less depreciated system to depend upon; similarly, considering this fact, while waiting on a slow improvement the disease is extending its area.

A decided break in the faulty cycle is necessary and is best secured by a removal to a locality where the upward step will be forced immediately.

Invalids are certainly more quickly invigorated at some places than at other, but present day research, for instance the recent ascertaining of radio-active constituents of the atmosphere at high altitudes and over snow fields, again reminds us that our knowledge of physical conditions and our understanding of the influences which allow better results in favorable regions are but in a transitional stage, and the full explanation of the effect of certain climates as influencing health must be left to the future.

Contaminations of inorganic dust may irritate an inflamed area, organic particles may become poisonous when inhaled, and air borne microbial life may and other contagions on fertile ground and thereby increase the severity of the disease.

A relative absence of such atmospheric contamination must favor the regaining of health, and this is a partial explanation of the better results secured in favored localities.

It is notable that wherever the best results are obtained—be it among mountains where changes of temperature are sudden or in lower hot and dry regions, along moist and balmy shores or in regions of bracing cold—there is always present in such places an abundance of sunshine, in striking contrast to where tuberculosis is most prevalent and most fatal.

Though sunlight is everywhere there are local differences in the quality of the sunshine as well as in the quan-

tity. The air is denser toward the sea level and the watery vapour, carbonic oxide, dust, and other heavier constituents of the atmosphere are nearly all in the lower strata. These complex molecules and particles are obstacles to the passage of the rays of the sun and especially hinder those of a shorter vibration-period. Hence there is a loss of energy-imparting rays even when there is no appreciable diminution of light, and consequently at altitudes above the lower contaminated strata and in dustless or dry localities the sun's ray are more potent.

From observations in the far north I am inclined to the opinion that latitude also may have something to do with the potency of the sunshine. Among the radiations from the sun are included some of those affected by magnetic field, and the earth acting as magnet might deflect this portion of the stream of approaching waves.

This thought is merely advanced as another hypothesis in the present transitional state of Climatology.

When cases of a mixed-infection have been reconvered back to the type of a simple tubercular infection, and the combat thus limited to nature and the tubercle bacilli, a cure should ensue in early cases, for the unsupported tubercle bacillus is not an aggressive opponent. The infection may have such slight activity, or be so well withstood, as to be practically quiescent for years but will flare up under other inflammatory affections. In other cases a real cure occurs, and then the so-called relapses are distinct new infections in a lung already scared by the previous attack. Regarding relapses either as a reactivity or as a reinfection, it follows that when one is apparently cured his remaining free from the disease depends on his holding to the same standard of vigor which served to overcome it. In this connection it will be observed that the special climatic features which were so desirable before have served their turn and are now not needed.

Whatever may be the climate of the convalescents former home, he lived there for years before contracting tuberculosis and he can live there again with safety as far as climate alone may have to do with his case, except there be local features to provoke a repetition of other conditions to which he might succumb.

If the object of a change of climate in tuberculosis is to relieve the economy of extraneous retarding influences and to stimulate flagging energies, then the places par-excellence are in the Arctic, where in the summer months, some localities hold all the essentials to force and carry on a rapid and decided impetus toward a cure. I have elsewhere * already described the conditions in some of the fords which enter the interior of Greenland, where the sun does not set during the summer months and for days at a time unintermittently shines most potently to impart vitality.

Every breath is taken in a sterile and entirely dustless air which brings no additional infection, and there is a complete absence of colds or other catarrhal affections to provoke exacerbations of the disease. The bracing climate has a temperature about 40° F. and the dayly variations are less than occur in the single hour following our sunset here. Also perfect nerve rest is secured without accompanying monotony.

In the Arctic the anaemic men and animals who have been deprived of sunlight during the winter, and the vegetation, all leap into pronounced vigor in the summer months as if Nature not only compensated them for the past darkness and cold but would, in the short time, rejuvenate and fortify all against the next depression of winter.

An exaggerated forcing of vitality such as this is

* American Medicine, April 23, 1904.

Washington Medical Annals, November, 1904.

what the tuberculous need to begin and ensure their cure, and it might also be said to figuratively represent alike the object and the utility of climatic-treatment.