

POOR HEALTH IN THE CHILD: SOME DEVELOPMENTAL INFLUENCES AND THEIR IMPORTANCE TO THE ADULT.*

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I. INTRODUCTION.

What per cent. of ptoses, adhesions, and other abnormalities of the adult are congenital? What proportion of the community suffers from them? What is their influence upon health? What is the proper treatment of these conditions? What is their influence upon the health of the children of the future?

These and other questions are the results of experience with the often unsatisfactory medical and surgical treatment at present applied to a large class of semi-invalid children and adults included under terms such as sickly, congenitally unfit, asthenics, visceroptotics, and neurotics.

The present paper outlines the first steps in a systematic attempt to put some of these questions on a basis which will permit of a satisfac-

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tory answer, and is in the nature of a preliminary note on some two years of work, more detailed reports of which will appear later. Much of it is from a period of sixteen months at clinics and post-mortem rooms in Europe; the remainder is more recent, especially certain observations from the children's department of the Massachusetts General Hospital Out-Patient Department, some findings during the new second year course in cross-section anatomy at the Harvard Medical School, and a rather extensive review of the literature, a summary of which may be found in the form of a bibliography which has recently appeared.*

My belief in the importance of the pediatric end of this developmental problem results from post-mortem work upon the adult, for it soon became evident that many of the peculiarities found in adults could also be demonstrated in children, in infants, and often even in the fetus. In such a case, it is obvious that the primary problem lies not in an adult, but in the child or infant in whom this adult has his origin; conversely, it has seemed probable that many an adult could have been spared years of misery and inefficiency, and have had much added to his productive power by adequate attention during his period of growth.

The world is full of people who from the point of view of the efficiency expert are below par; who as hypo-producers and often as hyper-reproducers become to a variable degree a burden upon the resources of others. Having excluded such extraneous causes as alcohol, syphilis, hookworm, and faulty habits, there will remain many cases for whom some other explanation than a neurosis must be found. Of these, many may be traced to demonstrable physical defects. But it is not enough to call the sufferer bilious, or weakminded, or tubercular, or rheumatic; for constitutional differences largely determine the diseases to which the individual is liable. Tuberculosis is a marked example of a disease which thus becomes a symptom by which we may state the developmental type of its victim.

The developmental influences to be discussed may be considered under the following three groups.

II. DEVELOPMENTAL INFLUENCES CLASSIFIED.

A. *Variations in Type Forms.* From a developmental point of view, man, judged by his intestine, belongs between the carnivorous and the herbivorous animals, and is more nearly related to the latter than to the former (Treves). Consequently the race falls into three type groups: (1) the herbivorous, (2) the intermediate, and (3) the carnivorous. It has long been known that type 1 has a wide short body form and a relatively long intestine, and that type 3 has a thin long body form and a relatively short intestine. This relationship between body form

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and intestinal length has been traced as far down in the scale of life as the reptiles and the insects (Dreike). Type 2 is of course less sharply defined, being as it is intermediate between the two extremes. More recently Bean has distinguished three groups on the basis of the germ layers, and has not only been able to recognize them by body form and the shape of the ear, but has made a rough classification of the diseases to which each type is subject. Also, and with reason, there have been many reports on the effect of the upright posture upon the viscera, a change which bears hardest upon the long, loose jointed, trumpet eared, carnivorous type of individual, since his loosely adherent viscera, so well adapted to his four-footed manner of life, work at a great disadvantage in his new attitude; and Goldthwait has found that these type differences apply to the shape of the lumbar vertebrae no less than to the other components of body form.

B. *Variations Common to All Types.* In this group belong many variations of the viscera, which may be roughly classified as follows:

(1). Abnormal persistence of normal fetal structures.

(2). Alterations in development of normal fetal structures: (a) Arrest of development. (b) Excessive development.

(3). Absent development and malformations.

As an example of (1) may be mentioned the persistence of the caudal edge of the ventral mesogastrium, causing constriction of the duodenum, just reported by Harris; (2a) is represented by the undescended cecum or by a common mesentery for the whole intestine, and (2b) by such formations as Lane's kink. Under (3) would come such abnormalities as absence of a segment of intestine, or of the abdominal wall, or the presence of a true megacolon, as recently observed in a stillborn infant at the Harvard Medical School.

C. *Variations in the Development of the Ductless Glands.*

(1). Metabolic disturbances. (a) Organic. (b) Inorganic.

(2). Trauma.

(3). Other causes.

There is less known about this group than about the other two, but that the effects of varied diets upon the development and activities of the ductless glands is of real importance, with the resultant possibilities of alterations in function of the whole organism, is sufficiently evidenced by reports in the literature.

III. OBSERVATIONS ON POST-MORTEM MATERIAL.

Largely in Group IIB fall my observations on material obtained in Berlin through Prof. Pick at the Friedrichshain Krankenhaus and through Prof. v. Hansemann at the Virchow Krankenhaus during the fall of 1912 and the spring of 1913. Although more than three hundred autopsies were followed during the year in Ber-

lin, Prague, Vienna, Hamburg, and other places, it was difficult to obtain the freedom desired, and even in Berlin various circumstances combined to prevent my obtaining satisfactory records in more than 218 cases. Undertaken as an orientation in the study of ptosis in the adult, the literature was avoided in order that any conclusions might be unprejudiced. Having reached certain conclusions, and having now reviewed the literature, it is hoped that by a study of an additional 300 cases in Europe during the coming six months, some valuable results may be obtained; for though it is doubtful if many new combinations will be recorded in a further series, a total of 500 autopsies should give a sufficient basis for establishing the normal limit of variations in unselected material,—a standard now sadly needed by which to judge findings in small groups of cases.

A. *Method.* To use a metaphor from deep-sea dredging, it seemed probable that from the application to the problem of a mental dragnet, in the form of a record of as many different facts as possible concerning a given case, whether seemingly related or not, there should result some light on the questions of cause and effect within the abdomen. The necessity of such a method of attacking the question is made the more obvious by a review of the literature. One may find nearly all the single facts of interest recorded, but thus far it seems that no one has attempted a correlation of the whole. The material was unselected, including men, women, and children, infants, and feti, from a length of 12 cm. to an age of 89 years, and the following observations are based for the most part on the first hundred of these cases. Notes were found valueless unless written in the interval between the examination of one case and the next, and it was necessary for purposes of comparison to record the observations obtained under 58 different headings. The work was done without interfering with the routine post mortems, the external measurements and observations being made before the autopsy commenced, and the viscera examined *in situ* during the routine examination of the thorax, the intestine being measured after removal from the body. After experience with about 30 cases, the following system was arrived at:

Four sets of cards were used: 1. External measurements, etc.; under this heading were recorded the case number, sex, age, occupation, disease, and height; also two measurements of the thorax, three of the abdomen, two of the diaphragm, the length of the small intestine and of the large intestine, and the condition of the rib cartilage and of the cartilage of the knee-joint. 2. General observations; such as development, nutrition, the amount of external fat, peculiarities of the thorax, abdomen, extremities, heart, lungs, and diaphragm, the presence of icterus, or ascites, the condition of the omentum, and the amount of intra-abdominal fat. 3. General intra-abdominal; as adhesions, presence of gall-stones, and remarks on the gall-bladder, liver,

spleen, pancreas, kidneys, adrenals, and genitalia. 4. Gastro-intestinal; adhesions, apparent length and disposition of the transverse colon, and notes on the condition of the stomach, pylorus, duodenum, ileocecal valve, appendix, ascending colon, hepatic flexure, transverse colon, splenic flexure, descending colon, sigmoid flexure, and rectum. It was not possible to obtain notes under every heading on each case, but even an average of notes under some 28 headings per case has supplied some interesting correlations. The adhesions proved difficult to record, and resulted in a mere note of presence or absence on card 4, while on card 3 a detail was given by means of numbering the organs from 0 to 17; thus in case 73, a man of 87, the figures 0-1-2-3-4-9-11 signify a mass of adhesions, including the liver, peritoneum, omentum, gall-bladder, duodenum, ascending and transverse colon. Case 54, a man of 60, with adhesions numbered 3-4-11, 2-4-11, is interpreted as a band from the gall-bladder across the duodenum to the transverse colon, and a band of omentum across the ascending and transverse colon, thus giving in this case practically the lesion to which Harris recently referred, and a form of Jackson membrane. In case 87, a man of 76, under 3-4-11, 1-7, and 2-13-14, we have three lesions, the band across the duodenum from the gall-bladder to the transverse colon, the appendix bound to the peritoneal wall, and a band of omentum across the descending colon and sigmoid flexure, or more properly speaking, the iliac colon.

B. Thorax. In measuring the thorax, two levels, determined by convenience, were used for the purpose of recording variations in the size of the lower thorax. In all newborn infants measured, the circumference at the tip of the eighth rib equaled or exceeded that at the lower border of the sternum; the upper level falls below the breasts of the female, and the lower is at a natural angle of the ribs, below which it is difficult to use even a steel tape with accuracy owing to the rapid decrease in size of the thorax as it merges with the abdomen. One does not often find the lower measure less than the upper until about 5 years of age, after which the narrowed chest increases in frequency, so that in the total of 9 children in which this double measurement was recorded in this first series, only 57% have the full normal infantile type, and in the total of 43 adults one finds the normal in only 33% of males and 37% of females. Thus we see that the full infantile thorax, at least in the working class from which this material is drawn, is slightly more common in the adult woman and the so-called tapering feminine thorax of the artist is rather more common in the grown man; in other words, the male thorax is abnormal in 67% and the female in 64% of these cases. In using these thoracic measurements, it is observed that all complicated calculations are avoided, and that, first, although both measures may be the same, both may be above or below the normal for a given height; second, when the upper measure is normal for a given height, the lower measure is really the

more important, since it is a better indicator of internal derangements.

What is the significance of this change in thorax form? Harris, as later discovered, has concluded that nephroptosis in the adult runs parallel with this narrowing lower thorax, and that he can predict the position of the kidney by his measurements. He finds the kidney low in 56% of 126 adult women, and considers the low kidney the result of the narrowed body form. He believes that owing to the lessened capacity of the thorax, attributed by Goldthwait partly to postural depression of the diaphragm, the liver is forced downward, it in turn acting directly to depress the kidney; this is soon sufficiently low so that all further downward pressure acts above the centre of this organ, to force it still further downward, and thus such trauma as coughing tends always to increase the nephroptosis.*

Osler considers nephroptosis four or five times as common in women as in men. If this is so, according to Harris the narrowed chest should be much more frequent in women than in men; but from my figures the narrow chest is even more frequent in men than in women; also, a low liver is not incompatible with a high, firmly fixed, apparently normally placed kidney, and conversely, the kidney may be found low with the liver high. Therefore it would seem unlikely that Harris is wholly correct. Is it not more probable that ptosis is rather a cause than an effect of the narrowed thorax, since the incidence of the narrowed chest in the adult is only 65%, while ptosis may be put at 75%, with adhesions yet higher at 84%, and since this difference in relative frequency is even more striking the younger the child?

The causes of this narrowed chest would seem to me to be multiple, as for instance the limitation of body type, an unusually low attachment of the diaphragm on one or both sides, and intra-abdominal conditions such as ptosis and adhesions, in addition to the usual trauma of life, which include occupations, bad habits, and fatigue.

C. Diaphragm. In addition to the usual note on the highest level of the dome of the diaphragm on both sides, a second measurement was possible owing to the routine manner of the thorax examination employed by Prof. Pick. Since the thorax was always opened with a knife by a cut along the junction of rib cartilage and bone, it was possible to observe at what level this incision intersected the diaphragm, in other words, to register its height of attachment in this anterior location. A considerable number (40) of observations gave an average height of attachment on both sides at this point, of the seventh rib, with a variation from the sixth to the eighth, on one or both sides, and it seemed

* As a possible source of error in the clinical determination of nephroptosis in the adult is suggested the presence of the so-called corset lobe of the liver; often these little lobes have been seen which, post-mortem at least, would have seemed to have been in life a not improbable source of confusion to the diagnostician.

that this irregularity had some influence on the shape of the lower thorax.

D. Adhesions. Adhesions of some sort were present (including frank peritonitis) in about 86% of 77 adults, and 71% of 20 children; excluding peritonitis cases, adhesions or bands were present in 83% of 46 male and 86% of 27 female adults; in children, adhesions were present in 77% of 9 males, and 50% of 8 females, the youngest child in this group being 1 month and the eldest 16 years old with 50% of them between 1 and 8 years of age. Thus, though the initial rate is 22% higher, the adult male has increased his rate only 6% as against an increase of 36% in the female, and in the end the male has a 3% lower rate of frequency than the female. These figures are, of course, from a small number of cases, but they are suggestive in two directions: the female children average younger than the male, and it may be that part of the percentage difference in children is due to age, but this would not account for the final male ratio. On the other hand, even if the female child ratio were for age equal the male ratio, it would make even more striking the fact that at the age of 16 years this series of 100 cases had acquired 85% of its total supply of adhesions. Unfortunately, I have found no figures with which to compare these.

Morris, in a discussion of the location of adhesions, gives four groups in the following order of frequency: Gall-bladder, cecum and appendix, pelvis, and sigmoid. Robinson, giving a longer list of locations reverses this order, *i.e.* mesosigmoid 82%, pelvis 80%, ceco-appendix 72%, and gall-bladder 68%. My results correspond with those of Morris: In detail, the gall-bladder was involved in 58 cases, the transverse colon in 55, duodenum 39, omentum 31, ascending colon 29, hepatic flexure 23, peritoneum 23, liver 21, appendix 14, right kidney 6, cecum, splenic flexure and descending colon 4, adnexa 3, sigmoid flexure 2, terminal ileum and rectum 1, small intestine, 0. Frank peritonitis from any cause was excluded from this list, and almost no cases except those of peritonitis had been operated upon. In a word, the upper right quadrant was the most common seat of trouble in the proportion of 140 to 19, which number is for the right lower quadrant.

Two other points of interest in regard to adhesions may be mentioned. First, in those cases in which the appendix seemed normal, the various adhesions were fewer, of a simpler type, less often multiple, and less often situated at the flexures; there were fewer gross changes in the gall-bladder itself, but more gall-stones (*i.e.* 19% of 42 abnormal, vs. 8% out of 24 with normal appendices), and slightly more abnormal knee joints (50% of 6 vs. 40% of 14 normal cases). Second, adhesions were absent in only three cases in a series of 25 adults. In two of these the double thoracic measurement was recorded, and in both the thorax was of the full infantile type with the nutrition good.

E. Ptosis. In my consideration of ptosis, the transverse colon was eliminated as being too loosely attached. Four organs were chosen for record,—the stomach, ileo-cecal valve, liver and right kidney. It was found that with slight pressure and a downward sweep of the extended hand from the cardiac toward the pyloric orifice, the lower border of the stomach could be closely approximated to the level obtaining in the upright position; the stomach was then called low if the greater curvature came below the level of the umbilicus, and in addition it was noted when the greater or the lesser curvature of the stomach came to the level of the promontory of the sacrum, about half way from the umbilicus to the pubes. The ileo-cecal valve, taken as a more definite point than the cecum, was considered low when its lower border came below the brim of the true pelvis, and the liver when its lower border came below the costal border. The kidney was considered low or loose when it could be moved freely for more than three or four cm. in a vertical direction.

Under these conditions, ptosis was absent in 10% and general in 22%, while one or more of the organs named were low in 75% of 30 cases. In 40 cases the liver was low in 45%, and in 50 the kidney low in 42%. The stomach and ileo-cecal valve were low in 50% of 63 cases, and in these the greater curvature of the stomach reached the sacral promontory in 27%. In another small series, the position of the stomach was recorded in 17 children and 71 adults as follows:

Children.	No.	% Low.	% to Promontory of the Sacrum.	
Male	8	63	0	
Female	9	88	44	
Adults.	No.	% Low.	% to p. s.	% Lesser Curvature to p. s.
Male	42	74	17	2.38
Female	29	90	53	3.48

In all newborn children examined the stomach itself was above the level of the pylorus. In one adult woman and one adult man, the lesser curvature had reached the promontory of the sacrum. Between these two extremes, it will be seen that dilatation of the stomach, for true ptosis of the cardia and the pylorus is not very frequent, is not only distinctly more common in the female at all ages, but of a decidedly more severe type than in the male. This increased frequency in the female applies no less to the position of the ileo-cecal valve, as shown by the following:

Children.	No.	% Low.	% in Pelvis.
Male	9	22	0
Female	7	86	28
Adults.	No.	% Low.	% in Pelvis.
Male	41	41	0
Female	27	66	25

The extreme per cent. in female children is doubtless due to the small number of cases recorded, yet it goes to show that the low ileo-cecal valve is in the female congenital to a much greater degree than in the male. Smith, in a series of over 1000 infants less than three months of age, found the cecum in the pelvis in 10%, but in this 10% there were 34% males and 66% females; thus he found the condition about 100% more frequent in female than in male infants. There is an obvious discrepancy between my figures and those of Smith, but it is at least in some measure due to age differences. As previously stated, the stomach is always small and high at birth; in the same way, the kidney is always high and firmly fixed at birth, and it seems not improbable that some of these recorded differences are due to developmental adjustments of the peritoneum and mesentery, continuing during the first year or more after birth. In any event, it is certain that prolapse of the ileo-cecal valve is much more common in the female than in the male, and that there is less increase with age. In other words, a low, loose cecum is a female characteristic, and it has been explained by several writers on the basis of a physiologic adaptation for pregnancy.

Appendicitis in my series was no more frequent with than without ptosis, which suggests that in such cases it is less often a primary offender than is commonly supposed. It was also noted that the fulminating cases of appendicitis seemed to occur chiefly in children with particularly good health and general development, who showed no sign of pre-existing adhesions about the appendix or elsewhere in the abdomen. Turning back for a moment to the figures on adhesions, it will be seen that in point of frequency for age, adhesions precede the ptoses in the male, while the reverse is true in the female.

F. Nutrition. In the field of developmental adhesions about the intestine, my observations have been in accordance with the work of Eastman, Flint, Gray and Anderson, Harris, Konjetzny, Rjesanoff, and others, and there is one new point to add to the subject of duodenal obstruction. In addition to the cause mentioned by Bloodgood, and Codman, and the adhesions demonstrated by Gray and Anderson, one may not infrequently find on careful examination of the duodeno-jejunal juncture a slight anomaly of the ligament Treitz. Usually this ligament is so arranged that the first portion of the jejunum crosses the vertebral column from right to left before turning downward toward the pelvis; but in the cases in question, due apparently to a slight prolongation of the inferior aspect of this little ligament to the right, the duodenum terminates in a jejunum which may reach part way across the vertebral column, only to turn sharply on itself toward the right, following the direction given it by the anomalous ligament of Treitz. The result is obvious: there is provided in this developmental

kink an excellent opportunity for the blocking of the duodenum by moderate pressure from a loaded stomach or other cause.

Dilatation of the duodenum was observed with constriction of the lumen by adhesions in 1 or 17.6% of 6 male, and in 1 or 20% of 5 female children; also in 5 or 8% of 65 adults. In 38 male adults dilatation was present in 16% and dilatation with constriction in 6 or 2.6%. In the female adult, dilatation occurred in 40% of 27 cases with constriction in 18.5%. This is in line with the increased frequency of the other intestinal conditions in the female.

Nutrition is apparently in some degree related to the narrow chest, since it is always good in the cases with a normal thorax and usually bad in proportion to the narrowing of the chest in the other cases, that is, with a decrease of the lower thoracic measure below that of the upper of 1 cm. or more. The position of the diaphragm may also play a part here, for out of 8 cases, it is recorded as low in 7 narrowed cases, and as normal in the only normal case. Thus it is possible that variation in the level of the attachment of the diaphragm may be a predisposing cause to ptosis and poor nutrition as well as to the narrowed chest.

My cases confirm the previous observations of others on the existence of a relatively short length of intestine in the tubercular and the asthenics (or static lymphatic type), the hyper-onto-morphs as Bean would call them. It has also seemed that in the absence of constricting adhesions an added length of intestine for a given body height is an advantage; but that in the presence of adhesions interfering with bowel function, added intestinal length becomes a positive disadvantage in proportion to its excess. Consideration of intestinal length is, however, always subject to the finding of almost 100% difference between maximum and minimum length in any unselected series of cases, thus requiring some care in interpreting results.

In a group of children in whom only three were noted as emaciated, these were the only three recorded as having adhesions about the hepatic flexure; they also had very short intestines, that of a boy of 16, for instance, being shorter than that of a healthy girl of only 8 months of age in the same group. These hepatic adhesions were of the developmental type. Is it not possible that in these cases the adhesion determined the lack of growth of the intestine through impairment of nutrition, and that in turn, nutrition was interfered with by the short intestine, thus establishing a vicious circle which could only be broken by relieving the adhesion?

In view of an equal sex distribution of joint lesions and of the preponderance in these lesions of liver and gall-bladder troubles, the sex distribution of gall-bladder changes may be mentioned. No stones were found in children, but the gall-bladder was noted as thick in two of four males, and all of four females. In adults, the gall-bladder was noted as thick in 50% of 26

males and 20 females, but stones were present in 23% of the males and 35% of the females, an increased frequency of 13% in the latter.

It is perhaps admissible to consider here a little end result evidence, as a side light on bodily function, in the shape of late changes in the cartilage in the ribs and of the knee joint. In 53 adults, the rib cartilage was normal in only 4, or abnormal in 92.5%, with 100% abnormal above 35 years of age. The youngest positive case was an emaciated boy of 16, dying from carbuncle of the lip, with the meninges of his brain afloat in pus. There were the usual calcium deposits above the vessels in the rib cartilage. The oldest normal adults were a thin man of 34, with tuberculosis, and a fat woman of 35 with acute post-abortive peritonitis. Aside from the calcium deposits about the vessels above mentioned, the common early change in the cartilage was an apparent drying and granulation of the whole cartilage substance.

The changes in the knee joint were of the type variously called senile, degenerative (Nichols), or hypertrophic (Painter). Occasionally, a slight hemorrhagic area was observed, but usually the change consisted in erosion or fibrillation of the cartilage, sometimes slight and superficial, and sometimes exposing the bone, allowing the formation of exostoses of varying size. The cartilage looked like the end of a twig which had been pounded with a hammer. Below the surface this cartilage almost invariably contained small millet-seed sized white granules, apparently of calcium. When slight, the cartilage changes always appeared first on the patellar surface, suggesting that the process involved the femoral and tibial surfaces only in the more advanced cases.

The knee joint cases are more interesting than those of the rib cartilage, showing as they do more apparent relationship to derangements of the biliary, respiratory, and circulatory systems. The joints were examined in 35 cases of the series of 100 on which this paper is based. If one joint was positive the other was examined, for both joints were always normal or always affected in more or less degree. Children were negative unless tubercular or otherwise clearly infectious. The youngest positive case was a woman of 21, and the oldest negative case a woman of 76. The sexes were affected equally, with about 62% positive, and 75% positive in 20 cases above 50 years of age. The most frequent age period was between 60 and 65, which included 25% of 33 cases. The following associated conditions were noted:—

Condition.	KNEE JOINTS.			
	NORMAL.		ABNORMAL.	
	No. of Cases.	%	No. of Cases.	%
Adhesions	9	100	24	87
Total liver changes	9	11	23	52
Gall-stones	6	17	6	83
Gall-bladder changes	8	12.5	17	70
Intestines low or loose ..	9	89	24	38
Kidney low	9	11	17	41

Liver very low	9	11	23	26
Cirrhosis	9	0	23	13
Perihepatitis	9	0	23	13
Flexures involved	9	44	24	54
Adhesions, simple	9	56	24	20
Nutrition:				
Good	8	50	22	45
Poor	8	37.5	22	41
Emaciated	8	12.5	22	13
Intra-abdominal fat plus	8	12.5	22	9
Disease:				
Lung	9	33	23	48
Heart-Kidney	9	11	23	35
Other causes	9	56	23	17
Rib cartilage abnormal ..	9	77	24	96

In height the positive cases averaged less than the negative, and yet the total intestine measured longer. In other words, the intestine relatively was distinctly longer in the positive cases. It may also be noted that this extra length was in the small intestine, for the large intestine was slightly shorter in the positive cases. Likewise the positive group contained the two extremes in intestinal length.

It will be observed from the above table that chronic degenerative or hypertrophic arthritis is more common in a rather short, somewhat thin type of individual, with a relatively long small intestine and rather short large intestine, a type of intestine likewise proved undesirable as the result of studying the nutrition of a group of young children. The joint case has also a high proportion of biliary troubles, of adhesions of the severer grade or those about the flexures, and of low kidneys. Apparently uncomplicated ptosis and simple adhesions are matters of slight consequence. In addition, the positive case shows more rib cartilage changes and a higher incidence of respiratory and especially of cardio-renal complaints.

G. Ductless Glands. Two notes on the suprarenal gland may be of interest. 1. Severe extensive hemorrhages were seen in newborn children at the Virchow Hospital. It is suggested that in a non-fatal degree such suprarenal hemorrhage with consequent glandular tissue destruction may be a factor in the suprarenal deficiency of some adults. 2. In later childhood or adult life, as recently observed at the Harvard Medical School, the right adrenal, especially in proportion to the degree of narrowing of the thoracic outlet with the usual low position of the liver in these cases, is exposed to direct pressure between the firm liver and the much firmer vertebral column. This follows upon the fact that the right adrenal, almost wholly unprotected by fat, even in stout people, lies in a thin strip between these two firmer organs; the left adrenal, on the other hand, more triangular in shape, rests in a protective pad of fat, safe from pressure by any heavy organ.

Questions of diet in the control of the ductless glands, as illustrated by the work of Hunt, Schiotz, and others, are certain to engage increasing attention no less than a study of the effects of the action of the different elements

contained in the various drinking waters. It has, for instance, been noted in examining the records of 40 cretins at the Massachusetts General Hospital O. P. D., children's department, that many cases have developed in children who have been breast fed for unusually long periods of time, *i.e.* from one to two years, and that these children have been habitually constipated from birth, sometimes in extreme degree. In a total material of 231287 cases, cretins occurred with a frequency of about 0.06%. One family history may be quoted.

A short stout healthy-looking intelligent Jewess who at the time of inquiry was engaged in getting a divorce. She was the mother of two cretins, the younger of whom was about five years of age. Both of these children were habitually constipated and both had been breast fed for more than one year. She stated with conviction that the whole cause of her misfortune was her long-continued ever-present sexual hatred of her husband. In view of the action of psychic effects upon secretion of the stomach, it is certainly not impossible that intense sexual aversion may act to depress the function of the ductless glands during pregnancy, and various workers on animals have found that a small thyroid or other gland in the mothers always determines the presence of a small or deficient gland supply in the fetus.

IV. CLINICAL OBSERVATIONS.

On the evidence of some 300 O.P.D. records from the children's department of the Massachusetts General Hospital, is presented the following well-known type of sickly child with which clinics are overrun. Though in one the nervous system, and in another the circulatory or respiratory system may seem the chief offender, the gastro-intestinal tract appears always to be involved if only in as mild a form as constipation or diarrhea, and underneath these more or less superficial manifestations, there seems to run a family resemblance in the form of an ill-adjusted or defective organism. Something is out of tune, off color, and the result is bad. One very constant finding is an excess of soaps and fatty acids in the stools, especially in the group of chronic intestinal indigestion cases. These are usually difficult to treat, always have an excess of certain food components in the stools, usually fat, and on examination the pronounced big belly is in marked contrast to the small chest and extremities.

The composite history of these children reads like the index to a standard system of medicine: there is almost always something going on, but there are certain critical periods. Usually marked gastro-intestinal symptoms appear before the age of two months. The child may then disappear until perhaps at two years of age it returns with glands of the neck and a history of frequent coryza, colds, coughs, and middle ear trouble. Then come adenoids, and tonsils, and by five years of age it is almost sure to have

added dental caries and perhaps pyorrhea alveolaris to the list. Meantime, it is likely to have had severe pertussis, bronchitis, furunculosis, eczema, or several of these complaints in addition to the usual exanthems; and in spite of all it continues to live and acquire yet more diseases.

On examination this child is pale and pasty if fat, or if thin, sallow with a yellowish tint to the eyes and the dry skin. The liver is felt 1 to 2 cm. below the costal border, with possibly some tenderness over the gall-bladder. The spleen may be enlarged and some degree of anemia is usually present. A blood examination may show in addition to the anemia a slight leucocytosis, with perhaps a relative increase of lymphocytes. Appetite is capricious, sleep poor, and enuresis frequent. The stools will show constipation or diarrhea, frequently with a foul acid or sour alkaline character. Tuberculosis is frequently suspected. The extremities are negative unless cold and purple, and the thorax, excepting active processes of the lungs or heart, is negative if not flattened throughout or diminished below. There is a curious absence of abdominal palpatory findings, which is in marked contrast to the habitual constipation or diarrhea, and the usual report is: abdomen flat, negative. This absence of local symptoms has often been reported in the study of chronic adult sufferers presenting positive intra-abdominal Roentgen findings. When one adds to the previous ailments those of the nervous system, from tic to epilepsy, the list becomes truly formidable; but it is surprising to see how many of these diseases can be accumulated by one child before it graduates from the pediatric department; and with a little trouble one may follow some of these sickly children through the intervening years to the operating table at the age of 20 or 30 for some intra-abdominal, usually gastro-intestinal complaint.

Compare for a moment the clinical and post-mortem findings. Which would seem to be the more primary, the widespread pathological intra-abdominal lesions of varying degree common to all ages and both sexes, or the multitudinous often evanescent diseases of the child? A consideration of the preceding paragraphs would seem to indicate that the definite pathological findings may act to interfere with nutrition and bodily function to the extent of producing a marked lessened resistance, and consequent increased susceptibility to the diseases to which these children are always exposed.

V. DIAGNOSIS.

Knowledge which will permit of relieving some of the underlying conditions affecting the health of the sickly child or the semi-invalid adult depends upon an appreciation of the significance of body form in its differing types, and of the characteristic postures assumed by these sufferers no less than upon the accepted laboratory methods. In addition there is presented, in

the form of a simple double thoracic measurement, a new, and it is believed a valuable aid, in the recognition of the probable existence of definite intra-abdominal lesions which might otherwise go unsuspected until the application of better known diagnostic methods.

VI. TREATMENT.

The treatment of these cases is essentially non-surgical, in that though an operation may be imperative for the relief of a constricting adhesion or other definite lesion, any approach to a cure is only reached through weeks and months of pre- and post-operative medical or orthopedic care, during which body form must be altered, posture corrected, and diet regulated to stimulate a natural organo-therapy. Failure with milder methods is, of course, the indication for the use of gland extracts or other more radical attempts at cure, but it is certain that no cases are so hopeless as to be incapable of some measure of improvement. The most important single point of attack is the narrowed lower thorax. If this can be restored to the normal full infantile type, the case will show improvement no matter what the intra-abdominal complications. The second indication is to provide the patient with a natural abdominal bandage, replacing the familiar "clam-belly" by firm and efficient oblique and transverse abdominal muscles which will hold his loose viscera where they belong in the now enlarged upper abdominal cavity. In this connection it may be observed that the rectus is less efficient for the purpose than the muscles just referred to, and becomes still less efficient as a binder in proportion to the increased depth of the thorax. The third point of importance is to provide the patient with back muscles strong enough to maintain the normal shape of the thorax under any and all stresses of life to which he may be subject.

A more complete consideration of diagnosis and treatment is reserved for the future.

VII. CONCLUSIONS.

1. Adhesions, ptoses, and other demonstrable physical defects are of very common occurrence at all ages in both sexes, but the frequency of these defects in the adult is not markedly greater than in the child.

2. It is not improbable that such defects may stand in a causal relation to some at least of the disabilities of the child and the adult.

3. An anomalous ligament of Treitz may be a factor in obstruction of the duodenum.

4. A simple double measurement of the thorax is presented, which is likely to prove an aid in the recognition of certain intra-abdominal abnormalities. This measurement is in a variable degree an indicator of physical efficiency, and is useful after the age of five years.

5. The treatment of developmental defects is primarily non-surgical, and if properly carried

out in the child is preventive, in that it will result in creating an adult not only personally more efficient, but one who may entertain the hope of having physically more perfect children.

6. "The problem is comprehensive enough to accept all the assistance it can through gymnastics, bandages, regulation of diet, and habits, and still furnish an abundant per cent. of human wreckage (Lane) for the surgeon to attempt to reclaim" (Schachner).

In closing it is a pleasure to express my indebtedness to Prof. Charles S. Minot and to Dr. Goldthwait for their continued interest and valuable suggestions during the progress of this work.

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Reports of Societies.

NEW ENGLAND PEDIATRIC SOCIETY.

THE THIRTIETH MEETING HELD AT THE BOSTON MEDICAL LIBRARY, MARCH 27, 1914.

FRITZ B. TALBOT, M.D., Secretary.

DR. MARSHALL FABYAN read a paper entitled,

BACILLUS OF CONTAGIOUS ABORTION.

ABSTRACT: The present efforts being made for the production of clean milk. As scientific investigation advances other factors of unknown importance appear. Dr. Theobald Smith nearly twenty years ago reported lesions occurring in guinea-pigs inoculated with cow's milk, as due to some unknown cause. The close similarity of these lesions to those produced by tuberculosis in the guinea-pigs, was remarked upon. In 1910 we met with similar lesions in guinea-pigs inoculated from the placenta of aborting cows. After much difficulty an organism was isolated which proved to be identical with the bacillus of contagious abortion discovered by Bang and Stribolt in 1895.

The lesions occurring in guinea-pigs are of extraordinary character, involving the spleen, lymph-nodes, liver, lungs and in fewer instances, the kid-