return only when the baby again becomes sick. In order to compare the gain in weight of these infants with the normal, we have prepared Chart 2 in which the normal gain per month is figured at 525 gm. The solid line indicates the gain in weight per month up to the time when the infant reached its greatest weight, the broken line the net gain per month of the infant when its last weight was taken. It is surprising to see how nearly parallel the normal curve and the curve of these infants run. In other words, we are able to make these babies gain practically normally only to lose them with acute disturbances. Of the 254 that attended more than one conference, 68 had no losses in weight, 81 had one loss, 36 two losses, and 62 three or more losses.

Chart 3, indicating the time in days after the last conference that the infants died, was somewhat of a surprise to us. We had assumed that our greatest

were only eleven, as few deaths as December and less than any other month in the year. In August, however, there was a very marked increase, the number of deaths jumping to sixty, one fifth of the total deaths of the year. September, which usually shows a marked diminution in the mortality, had fifty-one deaths, while October is again down to the average with twenty-three. These figures are especially interesting when taken in connection with the dates of admission of the ninety-one patients who died of gastro-intestinal disease during August and September. Of these ninety-one cases, twenty-two were admitted in July, twenty-six in August and six in September, so that 60 per cent. of the patients came to us sick, and so do not represent babies that we had been caring for for a long period of time, a group of patients whom we must reach earlier if we are to save them. Charting the respiratory and gastro-intestinal deaths separately, it is evident how the total deaths follow the respiratory deaths in the winter and the gastro-intestinal in the summer.

SUMMARY

1. Ninety-three per cent. of the deaths were in families with an income of \$15 or less per week.
2. Up to 6 months of age the average admission weight is approximately normal, after that it remains practically stationary.
3. The average monthly gain of the babies while attending conferences was practically normal (525 gm. per month).
4. About one half of the babies died within two weeks of the last conferences attended.
5. About 60 per cent. of the deaths from the summer gastro-intestinal disturbances were in children who were admitted to the stations during July, August and September.

CHRONIC DIGESTIVE DISORDERS IN CHILDREN

WITH ROENTGEN-RAY FINDINGS *

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AND

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Chronic digestive disorders in children are usually looked on as being due to bacterial infection, food intoxication, perversion of functions, or chronic appendicitis. That some of these conditions may at times be dependent on mechanical agencies operating in the digestive tract has received but little thought.

By chronic disturbances in children we refer to those characterized by one or more of the following symptoms: repeated attacks of acute indigestion with vomiting; abdominal distention, transient or habitual; repeated attacks of intestinal colic; habitually loose evacuations; extreme constipation, or periodic fever with intestinal association.

Children with persistent digestive disorders are habitually irritable, sleep poorly, and nearly all show malnutrition of varying degrees. In the vast majority of cases there is a secondary anemia. Many of these patients respond to properly directed treatment. There

Chart 4.—Deaths by months: solid line, number of deaths due to gastro-intestinal diseases; line of dots and dashes, number of deaths due to respiratory diseases; broken line, total deaths.

number of deaths was among the group of patients who had neglected to come to conferences. Just exactly one half of the infants died within two weeks of the last conference attended. Of those that attended only one to four conferences, a very much larger percentage died in the first two weeks. The general attendance was good during the first four months after registration, after which it fell off very considerably.

5. Deaths: Forty-nine of the infants were breast fed, 251 artificially fed. In Chart 4 we have charted the deaths by months. In addition we have subdivided the deaths into respiratory, gastro-intestinal and miscellaneous. The first two we have charted by months also. As a rule the summer peak of mortality is highest during July and August. The summer of 1915 was exceptional, however, inasmuch as the deaths for July

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remain a few, however, who are difficult to cure, and these come to the hands of the specialist.

We found that examination of the gastric contents, the blood, the urine and the stools did not supply the necessary information. It occurred to us that a Roentgen-ray study of the digestive tract might be of assistance, that mechanical defects might be at the bottom of the persistently disturbed physiologic and chemical processes which resisted treatment in some cases that was successful in others. That we have been aided in a manner far beyond our expectations will be brought out in the detailed report of cases.

Roentgen-ray examination of the digestive tract in babies and children has opened up an entirely new chapter in medicine. Valuable as the rays have proved themselves to be in the diagnosis of digestive troubles in adults, they have become of inestimable value in the determination of obscure diseases of the infant.

The exact size, shape and position of the stomach can be accurately determined. The presence and amount of air or gas can be detected and can be readily distinguished from a similar condition in either the small or the large intestine. The process of digestion can be studied, especially with reference to the normal or abnormal time of retention of food in the stomach or intestine. The cause of vomiting may be determined. Congenital deformities, such as pyloric stenosis, together with a determination of its exact degree may be detected. Congenital diseases, such as syphilis, may be discovered.

Intestinal disorders are found in many cases to be dependent on hitherto unsuspected factors, such as abnormal length or size of the intestinal canal, or some part of it, as the sigmoid flexure. Reflex nervous conditions, convulsions, asthmatic attacks, food idiosyncrasies, etc., may be found to have their cause here, and may be cured by appropriate medical or surgical treatment based on the Roentgen-ray disclosures.

The degree and cause of constipation may be determined in a definite manner heretofore impossible. Relaxation of the abdominal viscera may be detected in its incipience and corrected before it has become the disabling condition which it is known to assume in the adult, the treatment of which is one of the most difficult problems presented to the physician or surgeon today.

The problem of the long sigmoid merits most careful consideration from the anatomic, physiologic and medical and surgical points of view. The condition is frequently encountered. It is of congenital nature and does not apparently disappear with the growth of the child. The former view of anatomists and pediatricists that the rest of the colon grows at the expense of the sigmoid flexure is no longer tenable in view of the accumulated evidence brought forward by the Roentgen-ray study of the living anatomy of individual children over a period of months and years. Once a long sigmoid, always a long sigmoid. But when recognized and properly reckoned with and treated, its evils may be greatly mitigated or entirely eradicated.

The recognition of varying degrees of pyloric stenosis in older infants or children is of the greatest aid in treatment. Whether some of these cases are of congenital origin, but not of the degree to demand surgical intervention in infancy, is a problem which we hope to be able to throw some light on in the near future.

CASE REPORTS

CASE 1.—A boy, poorly nourished, aged 5½ years, weighing 41½ pounds, was referred to Dr. Bumsted, Newark, N. J. The hemoglobin was 52 per cent., red blood cells 4,640,000, and urine negative. The child had seven convulsions of intestinal origin in the previous three years, and had been habitually constipated, requiring medication every day from birth. He was very irritable and unhappy. Milk had been stopped for one year because it had been thought not to agree with him. The Roentgen ray revealed the sigmoid extending upward almost to the splenic flexure. As a result of treatment in three months he gained 6 pounds, 4 ounces, the constipation was relieved and the disposition was much improved. There was no further trouble, and the boy is well.

CASE 2.—A girl, aged 3½ months, weighing 10 pounds, was suffering with malnutrition, extreme colic night and day, and constipation. An enema was required daily. The Roentgen ray revealed hyperperistalsis of stomach. The sigmoid was elongated, passing 1 inch above the umbilicus, and the stomach was distended with gas. The blood and urine were not examined. As a result of treatment the child gained 5 pounds, 14 ounces, in four months. There was no colic, and evacuations were normal.

CASE 3.—A girl, aged 9½ years, and weighing 54 pounds, showed hemoglobin 40 per cent., and red blood cells 4,000,000. She was of delicate appearance, had moderate malnutrition, and showed very slow gain in weight. About every two months she had so-called bilious attacks simulating recurrent vomiting. The bowels were habitually constipated, and daily medication was required. The breath was offensive. The Roentgen ray revealed ptosis of stomach, and that it failed to empty itself in seven hours. There was marked ptosis of the transverse colon and marked elongation of the sigmoid. The child had one vomiting attack after the excitement of traveling, but as a result of treatment she gained 7 pounds in ten months, and a blood examination showed hemoglobin 60 per cent., and red blood cells 4,700,000. She required 7 drops of aromatic cascara three times daily.

CASE 4.—A girl, aged 9 years, weighing 52½ pounds, showed hemoglobin 60 per cent., and red blood cells 4,700,000. She was suffering from malnutrition, nausea and frequent abdominal pain and discomfort, but not constipation. The Roentgen ray revealed an elongated sigmoid with a loop in the pelvis and another above the crest of the ileum. As a result of treatment, the abdominal pain and nausea completely subsided. The child was well, but the parents failed to report the amount of gain in weight.

CASE 5.—A boy, aged 2 years, weighing 14 pounds, 5 ounces, showed hemoglobin 30 per cent., and red blood cells 3,000,000. He was pale, very irritable and poorly nourished and had laryngismus with frequent seizures. The stools showed evidence of tendency to diarrhea. There was persistent distention of the abdomen, and the appetite was poor. The urine showed few pus cells. The Roentgen ray revealed elongated sigmoid markedly dilated and passing 2 inches above the umbilicus. The boy was given two blood transfusions. At first 120 c.c. of mother's blood were given, and four weeks later 200 c.c. were given without improvement in anemia. As a result of treatment in four months, the boy gained 3 pounds, 13 ounces. The hemoglobin was 37 per cent., and red blood cells 2,700,000. The boy's disposition was much improved, and his appetite was very good. An interesting feature in this case was the gain in weight, the cessation of the laryngismus, and the general improvement in strength, notwithstanding the persistency of a high degree of secondary anemia.

CASE 6.—A boy, aged 18½ months, weighing 25 pounds, 2 ounces, showed hemoglobin 38 per cent., and red blood cells 4,400,000. He was well nourished, but had a poor appetite, and suffered with habitual constipation, requiring medication daily. The Roentgen ray revealed the sigmoid loop passing 3½ inches above the umbilicus. The long sigmoid was mostly to the left of the median line. As a result of treatment the boy gained 2 pounds, 10 ounces, in two and a half months. He requires one tablespoonful of liquid petrolatum

daily, and his massage twice a week. His appetite is satisfactory, and the stools are normal.

CASE 7.—A boy, aged 3½ years, weighing 23 pounds, 4 ounces, had hemoglobin 65 per cent., and red blood cells 5,200,000. There was marked malnutrition, as no gain in weight had occurred for six months. There were frequent attacks of diarrhea, and the stools frequently contained mucus. There was marked abdominal distention, and the appetite was indifferent. There were frequent fever periods with temperature from 100 to 104.5, with or without intestinal manifestations. The urine was negative. The Roentgen ray revealed elongated sigmoid passing 2½ inches above the umbilicus and 1 inch above the transverse colon. There was, moreover, some pyloric obstruction. As a result of treatment the boy gained 4 pounds, 6 ounces, in seven months, and there was a complete cessation of fever and diarrhea. The child is well.

CASE 8.—A boy, aged 5 years, weighing 33 pounds, showed hemoglobin 69 per cent., and red blood cells 4,960,000. He had frequent attacks of asthma, severe eczema, persistent distention of the abdomen and habitual constipation, requiring medication daily. Scratch skin test showed positive reaction to barley. The Roentgen ray revealed the sigmoid to be unusually redundant. It passed over to the right side until the shadow merged with that of the cecum, and then to a point 3 cm. above the umbilicus and down again into the pelvis. It was fully three times the normal length. As a result of treatment, the boy gained 2 pounds, 12 ounces, in ten months. He now has asthma very rarely, and is troubled but very slightly by eczema. He required 3 tablespoonfuls of liquid petrolatum daily.

CASE 9.—A boy, aged 5 years, weighing 32 pounds, 4 ounces, with failure to gain weight, showed hemoglobin 50 per cent., and red blood cells 5,300,000. Vomiting attacks occurred about every three months. There was persistent distention of the abdomen, habitual constipation and marked spasm of the anal sphincter. The Roentgen ray revealed elongation and dilation of the sigmoid, with an extra loop far over to the right, so that its shadow touched that of the cecum. As a result of treatment the boy gained 4 pounds, 4 ounces, in eleven months. The vomiting attacks ceased, and the evacuations became normal. The sphincter was stretched under anesthesia.

CASE 10.—A girl, aged 2½ years, weighing 25 pounds, showed hemoglobin 55 per cent., and red blood cells 4,600,000. There was malnutrition. She had three convulsions of gastrointestinal origin in the previous year. There was habitual constipation, and medication or an enema was required daily. The urine showed a moderate amount of acetone. The Roentgen ray revealed an elongated sigmoid passing 2 inches above the umbilicus. When the child was in the prone position the sigmoid passed to the right side as far as the abdominal wall. As a result of treatment she gained 4 pounds in four months, and convulsions ceased. The bowels require one-half teaspoonful of aromatic cascara daily.

CASE 11.—A girl, aged 2 years, weighing 21 pounds, 2 ounces, was poorly nourished. Blood examination showed hemoglobin 50 per cent., and red blood cells 4,200,000. The urine was negative. There had been no gain in weight for one year. The abdomen was markedly distended, and there was constipation requiring daily medication or an enema. The child was habitually irritable. The Roentgen ray revealed reduplication of the sigmoid, passing 2 inches above the umbilicus, across to the left and downward into the pelvis before it joined the descending colon. As a result of treatment the patient's disposition was much improved, and she gained 2 pounds, 12 ounces, in seven months in spite of a very severe attack of pertussis. She required one-half teaspoonful of aromatic cascara daily.

CASE 12.—A boy, aged 10 years, weighing 52 pounds, 12 ounces, showed hemoglobin 52 per cent., and red blood cells 4,000,000. He was thin and pale, and subject to frequent attacks of vomiting (about once a month), with elevation of temperature. There was frequent bronchitis, and the bowels showed a tendency to looseness. The urine showed a slight trace of indican. The Roentgen ray revealed elongated sig-

moid, about three times the normal length. There was an obstruction of the pylorus, ptosis of cecum, and gastric retention. As a result of treatment the boy gained 6 pounds, 4 ounces, in six months, the evacuations became normal, and there were no more vomiting attacks. The blood was unchanged.

CASE 13.—A girl, aged 10 years, weighing 63½ pounds, showed hemoglobin 60 per cent., and red blood cells 4,800,000. She was fairly well nourished but subject to persistent urticaria, occasionally asthmatic bronchitis, slight distention of the abdomen, and intermittent abdominal pain. Mucus was present in the stools in considerable amount, but there was no constipation. The Roentgen ray revealed ptosis of the stomach 1½ inches below the umbilicus. The stomach did not empty itself in seven hours. The colon was sluggish. The sigmoid was normal in length. As a result of treatment the girl gained 1¼ pounds in four weeks. The urticaria is much improved, and the evacuations are normal.

CASE 14.—A girl, aged 9 years, weighing 61 pounds, 12 ounces, fairly well nourished, showed hemoglobin 58 per cent., and red blood cells 4,800,000. She had habitual constipation requiring medication or enema daily, and was subject to recurrent vomiting and frequent eczema. She had had two attacks of acute intestinal indigestion in the previous six months, with temperature as high as 105. There were evidences of intestinal obstruction with frequent bowel movements. The Roentgen ray revealed marked elongation of the sigmoid, passing 1 inch above the umbilicus. There was prolapse of the colon at the splenic and hepatic flexures, with ptosis of the stomach. As a result of treatment there were no further intestinal attacks, and the child gained 6 pounds, 4 ounces, in four months.

CASE 15.—A boy, aged 5 years, 9 months, weighing 53 pounds, 4 ounces, well nourished, showed hemoglobin 45 per cent., and the urine negative. There were marked distention of the abdomen and considerable gas in the stomach and intestines. There was loss of weight, 2 pounds in three weeks. Pain was present in the abdomen at frequent intervals, and rarely a day passed without complaint. The Roentgen ray revealed an enormously dilated stomach, emptying very slowly, marked distention of the colon with gas, and a markedly elongated sigmoid, the loop passing to the right as far as the crest of the iliac bone, crossing over to the median line before joining the descending colon. The boy has just come under treatment.

CASE 16.—A boy, aged 2 years, 8 months, weighing 32 pounds, showed hemoglobin 57 per cent., and red blood cells 4,800,000. He was well nourished and the urine was negative. He had so-called bilious attacks, fever and abdominal distention every three to five weeks. There was extreme constipation, requiring an enema every day. The Roentgen ray revealed spasm of the pylorus. There was an elongated sigmoid passing 3 inches above the umbilicus, descending into the pelvis and again ascending several inches before returning to the pelvis. The child lives in a distant city and has been under the care of a local physician. The mother reports the child has not gained in weight but shows great general improvement.

CASE 17.—A boy, aged 11 years, weighing 65 pounds, was thin and showed habitual constipation, requiring medication every day. There were frequent attacks of very severe colic with abdominal distention at the time. The Roentgen ray revealed ptosis of stomach, and sharp angulation of the colon at the hepatic and splenic flexures with ptosis of the transverse colon. As a result of treatment there was no further colic, constipation decreased, requiring only 1 grain cascara three times a day. The Roentgen ray one year later revealed the greater curvature of the stomach ¼ inch above the umbilicus, with the belt on. With the belt off the greater curvature of the stomach was 2 inches below the umbilicus.

CASE 18.—A boy, aged 6½ years, weighing 39 pounds, showed malnutrition, slow gain in weight, and constipation, requiring medication daily. The blood and urine were not examined. The Roentgen ray revealed spastic condition of the colon without undue length. The boy has been under treatment only two weeks.

MANAGEMENT

Those patients who showed a ptosis of the stomach and transverse colon were fitted with a Dr. Aaron band, modified for children's use, with a transverse ridge or shelf so placed as to support the prolapsed part. The child was allowed but 2 ounces of milk or water with each meal. Immediately after eating he was made to rest on the right side for one hour to accelerate the emptying of the stomach, which was always retarded. Two and one half hours after the meal he was given milk or water to drink. In this way the weight of the food in the stomach at one time was lessened.

In cases with the sigmoid loop and intestinal stasis and constipation, massage and gymnastics were of great service. Liquid petrolatum and olive oil usually give better results than other laxatives, but in some instances it was necessary to give fluidextract aromatic cascara three times daily in sufficient amounts to produce an evacuation. We found in these cases, as in hundreds of others of ordinary constipation, that drugs in cathartic dosage may be harmful. Much better results are obtained by small doses of a laxative frequently repeated. We found that with massage and right food, the oil and cascara might be gradually eliminated. Massage and suitable feeding may have to be continued for a long time, probably until the child has grown sufficiently for the pelvis to accommodate itself to the redundant sigmoid.

Our dietetic regulations for the constipation cases are somewhat as follows: White bread, toast and crackers are omitted. Potatoes, rice, milk and eggs are given sparingly. Milk is often replaced by malted milk. Green vegetables are given twice a day. Stewed or raw fruits are given the preference as desserts. Fresh meats and fish are allowed. Whole wheat bread and oatmeal crackers are advised. Raw fruits are given with the stomach supposedly empty an hour to an hour and a half before meals. Strange as it may seem, this rarely interferes with the appetite. We have found the giving of raw fruits with the stomach empty one of the most valuable dietetic means of managing constipation. We are speaking now of cases without stomach involvement.

The Enema Habit.—The Roentgen ray in the above series of cases demonstrates the uselessness and possible dangers of the daily enema, high or low. It dilates and enfeebles the parts not involved, gives only very temporary relief and lays up trouble for future years.

Diarrhea.—In those cases with diarrhea or loose evacuations, all fruits, raw or stewed, and all vegetables were omitted from the diet. This symptom gave us little trouble, and responded readily to diet and simple medication. The patients with diarrhea gave an early history of constipation.

CONCLUSION

There are cases of gastro-intestinal disorders in children due to mechanical agencies. Such disorders will only be satisfactorily managed when the cause is known.

When the child's parents are shown the nature of the trouble by the Roentgen-ray findings they give much better cooperation and have much less criticism of slow improvement.

Probably many of the cases of ptosis of the stomach and intestine found in adults are of a congenital

nature, or have their origin during child life because of erroneous habits in eating. The child of 5, 6 or 8 years eats a large meal three times a day and with this drinks two or three glasses of milk, which he is urged to take. All of which means that 2 pounds of food or more are placed in the stomach (more weight than many can accommodate), and ptosis results.

ABSTRACT OF DISCUSSION

DR. HENRY D. CHAPIN, New York: I presented a paper on this subject several years ago. I showed a series of roentgenograms, the first to demonstrate the rapidity with which food would go through the intestinal tract of infants, and clinically to find out, so far as possible, the location of the pylorus. This study was limited to infants, and I would emphasize one point and that is that the sigmoid of the infant is a much larger structure than is ordinarily supposed. I had a series of fifteen plates. These babies were not sick; I was simply making a study. In several cases the sigmoid went above the umbilicus. In others the sigmoid was a figure-of-eight—in some cases it laid to the right and in others to the left; it was very movable and very large. The sigmoid proved to be much larger and more convoluted than previous anatomic studies had led us to believe. The practical point I made at that time, and which I still believe, is that these pictures show the utter uselessness of trying to give what is known as a "high" enema to a baby. You cannot possibly pass a soft tube through the sigmoid flexure of a baby. It simply curves around and around and it does not pass through.

If you simply pass a catheter from 2 to 3 inches beyond the rectum, having the bag only a foot or two above the level of the bed, and I proved it roentgenographically, you can fill the whole lower bowel in a minute or two. By reversed peristalsis we can soon fill the large bowel. Careful feeding is not enough in these cases. There is at times a structural cause for poor nutrition.

DR. L. R. DEBUYS, New Orleans: At the same meeting at which Dr. Chapin read the paper he just referred to, I reported a case in which there was obstruction—pylorospasm. It was a case of syphilis of the stomach, and showed the peristaltic waves and other symptoms usually seen in pyloric obstruction. The case cleared up with specific treatment. The air ball is nicely seen in these cases. I believe that the projectile character of the vomiting in these cases is due to the air ball. It is rather hard to conceive how the involuntary muscular fibers of the stomach can throw material the distance it does, and my explanation is that air in the baby's stomach along with the food becomes so compressed that in a pneumatic manner it causes the food to be thrown in the direction of least resistance, that is, through the mouth and nose.

DR. HARRY LOWENBURG, Philadelphia: I have been following up some cases in the same way in the hope that it would lead somewhere in the treatment of obscure conditions, especially in cases of obstinate constipation. I must confess that my results have been disappointing and after careful, and sometimes expensive, roentgenographic studies I have not found myself much advanced in the therapeutics of these conditions. I wish Dr. Kerley would go a little more into detail as to what his treatment was in some of his special cases; for instance, in the case of colic that he said was the worst he had ever seen. These cases frequently try our own and our patient's patience to the breaking point, not to mention the jeopardy in which they place our professional reputation. Mere talking to these women and showing them a roentgenogram will not suffice. They want their babies to be relieved. They often force us to resort to artificial nourishment. I do think that the point which he brought out with reference to pyloric obstruction is exceedingly valuable, and that it emphasizes the fact, which I have long maintained, that the mere presence of visible peristaltic waves and of a palpable pylorus do not, in themselves, constitute indications for operation. I think that the charcoal test, together with the roentgenographic studies, provides valuable data in reference to the

amount of material which passes through; thus permitting us to have some idea as to whether this is sufficient or not to sustain life, and it further enables us to decide for or against operation. I have also demonstrated that all surgical cases present a weight curve resembling the crisis of pneumonia, while all nonsurgical cases present a weight curve resembling the fastigium of typhoid fever.

DR. JOHN ZAHORSKY, St. Louis: I was led astray by the plates in one case. A child about 5 years of age had vomited everything for the last two months; this was the history obtained from the mother. Two or three doctors had treated the child for dyspepsia. On a careful examination I could get little information. I had a roentgenogram made, and it apparently showed a positive obstruction at the ileocecal orifice. Nothing seemed to pass through for hours and hours. I could not explain it. I did not know of any such thing as spasm of the valve. I thought it better to have an exploratory operation. A few days later the child was sent to the hospital. On arriving there, a history was given of a slight spasm. I again examined the cerebrospinal system. I had an eye specialist examine the eyes. It proved to be the beginning of a cerebral tumor.

DR. C. G. KERLEY, New York: The management in these cases consisted largely in the use of massage and gymnastics. In the little baby with the very severe colic, massage was given twice a day. In addition to this, one-half ounce of olive oil was given daily in divided doses. Aromatic cascara in small doses three times a day was given temporarily in a few cases, always after meals.

DR. L. T. LEWALD, New York: The question of so-called ileocecal spasm brings up a whole host of other questions. This question of correct interpretation bothers us all more or less. Either the roentgenologist has to go over the clinical record, or have the most close cooperation with the clinician, such as Dr. Kerley and I have had, otherwise we will go astray.

CARE OF TROOPS ON THE MEXICAN BORDER

FOUR MONTHS' MEDICAL EXPERIENCE WITH
AN ARMY OF ONE HUNDRED AND
FIFTY THOUSAND MEN

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The mobilization of the national guard on the Mexican border has offered unique opportunity for taking stock of our degree of medicomilitary preparedness, and for making a just estimate regarding the advances in military sanitation which have taken place since the last general call on the state troops in 1898. The mobilization of militia organizations began May 10, 1916, when the Texas, New Mexico and Arizona troops were called on and mobilized at San Antonio, Texas, Columbus, N. M., and Douglas, Ariz. The total number of men mustered in was about 5,000. Recruiting to increase the size of these southern organizations was soon undertaken. June 18, 1916, the remainder of the national guard was called out, and began mobilizing at the respective state encampments. June 30, certain northern contingents arrived on the border, and by July 31 the primary southward movement was practically completed, and approximately 110,000 national guardsmen in federal service were encamped along the frontier line from Yuma to Brownsville. Subsequently certain organizations were ordered home for muster out, and were replaced by troops which had been held for training and equipment at the home camps. The number of men sent south during the second and third movement in August and October,

respectively, was about 20,000, making the aggregate of state troops which have served on the border approximately 130,000. The largest number of militia on duty at any one time in the Southern Department has been about 110,600. Sept. 15, 1916, there were 101,684 officers and men present.

Prior to the arrival of the militia on the border, practically all of the regular organizations of the mobile army in the United States had been distributed along the frontier. This force numbered approximately 41,000 men, and was subsequently augmented by about 2,500 coast artillery troops of the regular army, employed in the emergency as infantry. Of the total number of regulars on the border, about 13,000 were employed in General Pershing's expeditionary force in Mexico, which used Columbus, N. M., as a base.

MOBILIZATION OF MILITIA

The mobilization of the militia clearly demonstrated many of the weak features in all branches of our militia system, but only those matters pertaining to the sanitary troops will be referred to here. The first point worthy of note has to do with the physical examination of officers and enlisted men in the national guard. In the regular army a high standard of physical fitness is demanded of both commissioned and enlisted personnel before entry into the military service. As a result of periodic examination, and elimination of the unfit, this high standard is maintained. In the case of the organized militia, the law provided, when a state certified that it conformed to the physical standards of the regular army, that its troops should be mustered into the federal service without physical examination, and that the men should, as soon as practicable thereafter, be examined under the supervision of a medical officer of the regular service. Most of the states reported that they complied with regular army standards, and their organizations were consequently mustered into the service of the United States. On examination by the regular medical officers detailed for the purpose, however, it was found that large numbers of the officers and men were unfitted for the military service because of physical defects, often of long standing. The proportion so disqualified varied greatly in different states, but in several reached from 30 to 40 per cent. of those mustered in. Aside from numerous instances of diseases, such as venereal infections, tuberculosis, nephritis, heart lesions and epilepsy, there were great numbers who were found to be disqualified because of conditions which could have been detected by a cursory examination; such were underheight, underweight, absence of teeth, defective vision and hearing, hernias, flatfeet, obvious deformities, immaturity, senility, etc. As extreme instances, men blind in one eye and wearing glass eyes, and one man with an artificial leg had been accepted. This failure on the part of the national guard to conform to the desired physical standard is due partially to lack of experience, time and care on the part of militia medical officers, and partially to the pressure which is often brought to bear by organization commanders in the interest of men whom they specially desire for one reason or another to enlist in their companies.

Such laxity in physical examination is a fundamental defect in the militia system of many states. A unit which loses at mobilization 15, 25 or 40 per cent. of its personnel because of physical defects is seriously handicapped at the outset by reason of shortage of men, and if it goes into active service still retaining