year, 2,472, or more than three-fourths, were found to be defective. The report named the principal defects found in these children. These figures speak more eloquently than I possibly can in the way of emphasizing the importance of medical inspection of schools. I agree with Dr. Barbour that notwithstanding children love to attend circuses and derive great pleasure from them, the harm that is done in the way of spreading contagious diseases in the community far outweighs the benefit the children derive from it.

Dr. Philip F. Barbour, Louisville (closing the discussion)—The city of Louisville has voted a bond issue of \$1,000,000, a large part of which is to be devoted to purchasing additional ground for the school children to play in.

THE IMPORTANCE OF PEDIATRICS AS A SPECIAL STUDY.*

BY LINNAEUS E. LA FETRA,

New York, N. Y.,

Associate in Diseases of Children, Columbia University; Visiting Pediatricist, Bellevue Hospital.

First of all, Mr. President and members of the Southern Medical Association, I wish to thank you most heartily for the honor you have conferred upon me by inviting me to address you on this occasion. It is a great pleasure to me to be present at the inauguration of a session devoted especially to a consideration of topics relating to the hygiene and the diseases of infancy and childhood. Your President asked me to speak on some general topic pertaining to diseases of children, and so I have chosen as a subject "The Importance of Pediatrics as a Special Study."

I would invite your attention not so much to the study of pediatrics as a specialty, as to the importance of special interest in and attention to pediatrics. It has been said, and with some truth, that devotion to a specialty narrows a man's vision; but pediatrics is not that sort of a specialty; it is one that, on the contrary, tends to broaden a man's medical vision and interests; for its problems involve the fundamentals of life and society.

Pediatrics means the study of everything

that pertains to the health of the child—its hygiene, feeding and management during the formative years, and the treatment of the disorders and diseases that arise during this period of life. It is therefore a widely inclusive study; having the closest relations to general medicine and surgery, as well as to obstetrics. Subjects that are intimately allied to pediatrics are the questions of heredity and its modern synonym, eugenics, the care of mothers during pregnancy and childbirth; the promotion of maternal nursing; proper housing; proper schools; length of school hours and time for luncheon and medical school inspection; provisions for playgrounds and parks, and the procuring of good, clean milk. Have you ever thought of the improvement in the general milk supply since the physicians most interested in children began this campaign for pure milk for babies in order to promote their careful feeding? Nowadays medical milk commissions are very numerous—and all because the medical profession as a whole is interested in proper infant feeding. The campaign for better milk for babies has improved all the milk supply and has greatly lessened the danger of milk-borne epidemics among adults as well as among children.

Pediatrics, therefore, is a broad study; it is one, moreover, in which for best success the physician should have a fondness for, and consequently a sympathy with, children. It is wonderful how much more of himself a child will unfold for inspection and study if the physician brings with him a friendly and genial, though authoritative atmosphere.

Special attention to the study of pediatrics is important for the general practitioner.

First, because such a large percentage of his patients are children. It has been well said that pediatrics is the specialty of the general practitioner.

How important pediatrics is may be judged from the fact that in 1910, out of a population of 91,000,000 in the United States, nearly 19,000,000, or more than one-fifth, were children under fourteen years of age; there were 10,

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600,000 under five years, and 2,250,000 under one year old. Of the 600,000 total deaths in the registration area, more than one-sixth, or 100,000, occurred in infants under one year, and more than one-fourth in those under three years of age. Moreover, the amount of illness or morbidity is, of course, greater than at any other period of life, embracing as it does the disorders of nutrition, gastro-intestinal disease and the contagious diseases of childhood.

In regard to the relative number of cases of disease in childhood which the general practitioner is called upon to treat, it may be of interest to know that at the Vanderbilt Clinic in New York, the proportion of children among the medical cases has for years been about one-third, counting as children those under twelve years of age. At the Boston Dispensary, which is the oldest institution furnishing medical aid to the poorer parts of the city of Boston, it has been found that children are the source of about half of the house visits made by the district physicians, and in the out patient, or ambulatory department, children form the largest single group.

Another feature increasing the demand for physicians competent to deal with infants and young children is the fact that these little patients become so suddenly and apparently seriously ill with conditions that in adults would scarcely cause an indisposition. As a consequence very often a physician is called to see a child with an illness that in an adult would require no treatment. Careful study of the case and an accurate diagnosis, however, are exceedingly important since really serious conditions may be present or may rapidly supervene. One might mention especially otitis media as a cause of obscure fever, often with severe nervous symptoms, and very commonly mistaken for teething. Also one must mention intussusception, byelitis, and acute gastro-intestinal disease, the last at times simulating appendicitis.

Moreover, the field of strictly medical work in pediatrics is very wide, bringing the physician into intimate relations with such other

specialties as dermatology, neurology, laryngology, ophthalmology and otology, and with the peculiar series of blood conditions and other matters of interest in clinical pathology. When I had charge of the Children's Department of the Vanderbilt Clinic it was not infrequent for us to consult with or be consulted by every one of the various departments mentioned in a single afternoon. There is no better way for a physician to keep in touch with all the various medical specialties than by working in a children's clinic and studying each case carefully.

In the second place it is most important for physicians to devote special attention to pediatrics for the sake of the little patients themselves. Many disorders and diseases appear only in infants and children, and many others have features that are peculiar to children. The physician who can make an early and correct diagnosis will prevent a great deal of suffering and much loss of life. There is in general a high susceptibility in infants and young children to nervous and cerebral disturbances evidenced by the ease with which they become delirious or have convulsions, and there is also a very unstable condition of the heat regulating center, so that the temperature is easily raised to a high degree from comparatively slight causes. Occasionally a marked depression of the temperature is met with.

Examples of diseases found with especial frequency or exclusively in childhood are all the acute eruptive diseases, together with whooping cough and mumps, also the hemorrhagic diseases of the newly born, intussusception, pyloric stenosis of either the spastic or hypertrophic form, status lymphaticus and enlarged thymus gland, rachitis, scurvy, cyclic vomiting, acidosis from poisoning by cream mixtures, and the various nutritive disturbances that have been described recently so completely by Professor Finkelstein, of Berlin.

As examples of peculiarities of diseases in

children and their unusual susceptibility may be noted the frequency of delirium in fever, of convulsions (which may be repeated) at the onset of pneumonia, tonsillitis, or gastrointestinal intoxication; the occurrence of opisthotonos due to pneumonia of the upper lobes or to otitis media; the presence of Cheyne-Stokes respiration simulating tuberculous meningitis in cases of acidosis; all of the above without any actual inflammation of the brain or nervous system. Wide and volatile changes of temperature from slight causes have already been alluded to. I have seen a range from 106 degrees F. to 94 degrees F. in thirty hours without any serious results. This enormous fluctuation occurred in a case of influenza in a baby fourteen months old.

Physical signs are often difficult to elicit and are frequently different in children, but without clear physical findings the temperature must always be an unsafe guide. Infantile diarrhoea and pneumonia, infantile spinal paralysis, influenza, rheumatic fever, which nearly always affects the heart instead of the joints, otitis media, and even acute rhinitis, all show physical signs and symptoms different from those they present in the adult. I have seen a child really prostrated with a fever of 103 F. from a simple cold in the head without any involvement of the ears or the sinuses. It cannot be too often emphasized that in manifestations of disease and in the management of nutrition and drug treatment the baby must not be regarded as a small adult. The baby's organism differs in the quality of its reactions to food, to diseases and to drug treatment, so that a different standard must be kept in mind all the while in dealing with these little patients. Home-sickness or the loss of a favorite nurse may so change the nerve control of the alimentary tract that the child may begin to lose weight even though the quantity and kind of the food, and the mode of life remain otherwise exactly the same. Even a little baby's vegetative functions are affected by the nervous-

ness or the placidity of the mother or nurse.

Failure to make a correct diagnosis in infants and children is generally due to a lack of thorough examination. And, in the examination, it should be remembered that the ear speculum often gives more important information than the stethoscope.

The most important problems, however, that the pediatricist is called upon to deal with are those of infant feeding and infant hygiene. It is in the field of infant feeding that pediatrics is most truly a specialty and it is this field that will most abundantly repay cultivation by the general practitioner. No adequate discussion can be made of even the principles of infant feeding in so short a paper as this, but at least a statement of the principles generally accepted at the present time can be given.

(1) First and foremost it cannot be too often reiterated that good breast milk is the best as well as the ideal form of feeding. But even good maternal nursing must be intelligently supervised, lest the baby be sick by overfeeding through too frequent or too long nursing. From human milk the baby gets no foreign albumin to put an extra burden on the intestinal epithelium, and in addition to proper food, which is not irritating to the gastro-intestinal tract, the breast-fed baby does get from the mother protective bodies that render it less liable to contract disease than is the bottle-fed baby.

(2) If the baby cannot be nursed entirely, mixed feeding, that is, partly from the breast and supplementary feedings by bottle, is the next best method. By having the baby nurse first and take the bottle afterwards, the normal stimulus is given to the breasts to keep up their activity, and the mixture of breast milk and modified cow's milk is more digestible than a whole meal made of cow's milk mixture. The breast milk helps to put the alimentary tract in a better condition to digest the cow's milk.

(3) For artificial feeding the best substi-

tute is modified cow's milk. Only the cleanest, freshest milk, and certified if possible, should be used; and the formula should be adapted to the size, activity and digestive capacity of the baby.

(4) The total quantity of liquid in twenty-four hours should be from 150 to 200 cubic centimeters per kilogram of body weight, or, in other words, the baby should drink each day an amount equal to from one-seventh to one-fifth of his weight. This food should be distributed through the twenty-four hours at the longest intervals consistent with the capacity of the baby's stomach and the comfort of the baby. For many artificially-fed babies every four hours is a proper interval. For others, especially small babies, intervals of every three, two and one-half or even two hours are much more satisfactory until the stomach capacity becomes greater. It may be remarked here that the stomach capacity of any given baby can be determined only by trial, and it will then vary with the nature of the milk mixture which is prescribed.

(5) The nutritive solids of the food are the proteids, fats, carbohydrates and salts. The proteids are the most important, since they alone furnish material for growth and they should constitute from 7 to 15 or 20 per cent of the total caloric value of the food. Roughly, the baby should be receiving for each pound of weight the amount of proteids represented in from one to one and one-half or two ounces of cow's milk. The total calories in the food should be sufficient to supply energy for the maintenance of life, for growth and for activity. This is roughly from 45 to 50 calories per pound for young infants. The exact figures for the caloric requirements in accordance with the surface area can easily be worked out from Dr. Howland's simplified formula recently published. The carbohydrates and fats will be used to complete the total number of calories required, it being kept in mind that the fat of cow's milk is somewhat difficult to digest, and is often the cause

of vomiting or diarrhea, and occasionally will give rise to serious acidosis. It should be remembered also that of the various carbohydrates, maltose is the most easily absorbed, but unless combined with starch or dextrin it may ferment too rapidly and may give rise to diarrhea or the formation of gas. Milk sugar, cane sugar, maltose, dextrin or starch may be used separately or in combination, watching meanwhile the effect on the stomach and the bowels and the general comfort of the baby.

(6) The formula advised should be as simple as possible for the benefit of the mother as well as for the ease of the physician. Complex mixtures and elaborate or algebraic computations soon consign the baby to the simpler methods of the proprietary food circular. We should take a leaf out of these commercial books and make simple dilutions of milk, skimmed milk or top milk, to which the needed amount of carbohydrate is added. The mixture may then be left raw, or it may be pasteurized or boiled according to the character of the milk and the condition of the stools. Weekly or semi-weekly weighings, together with a study of the baby's digestive symptoms and of the stools will serve as guides to the changes in the food, especially in regard to which food ingredient is to be increased or diminished. The great contribution of the percentage method of feeding has been that it showed us the possibility of varying separately the fats, the carbohydrates and proteids in the prescribed formula.

So much for healthy infants. When we consider babies suffering from gastro-intestinal disturbances we must bear in mind the very valuable researches of Czerny and Keller and of Finkelstein.

Food injury, especially damage done by excessive fat or by sugar, is the main cause of ordinary gastro-intestinal disorder. This is most commonly due to overfeeding. If the food injury goes on unchecked, serious metabolic disturbances may supervene, leading to

rapid loss in weight or even to death. Or, on the other hand, bacteria may enter upon the scene and produce lesions in the intestinal mucus membrane which then assume the chief role and persist in spite of the establishment of a proper dietetic regime.

The greatest resource we have in the treatment of severe diarrhea is the Eiweiss milk, or, as it is called in this country, the albumin or protein milk devised by Finkelstein. Consisting as it does of a high protein and a low whey and sugar, with a moderate amount of fat, it checks very rapidly the fermentative diarrhea and permits us to omit the purgation and the starvation period that so greatly increased the loss of weight in these cases as formerly treated.

Recently there has been renewed interest in the effort to determine from a bacteriological study of the stools what type of bacterial infection or fermentation is predominating. Further than to learn that in simple diarrhea there is an especial type of fermentation affecting the fats and carbohydrates, or an alkaline type of putrefaction affecting the proteids, but little of practical value has been brought out. In the infectious diarrheas there may be one of the Shiga group of dysentery bacilli as the cause of the inflammation, or the infection may be due to streptococci, gas bacilli, or according to some observers, even to colon bacilli. Treatment by means of cultures of bacteria supposed to be antagonistic to these germs has been tried, but with the exception of the use of Bulgarian lactic bacilli, it seems to me there has been little proven of any advantage. If the lactic bacilli are to be used they are best given in milk previously sterilized, then combined with the Bulgarian bacilli and incubated for twelve to twenty-four hours. Tablet preparations of the bacilli, because frequently inert, are not satisfactory. The study to find predominating flora in the intestines should be pursued, however, as it promises to give useful information in regard

to the dietetic treatment as well as to the possible benefit of bacterial cultures.

With prolonged or difficult cases of intestinal or gastric indigestion in infants careful study of the digestive symptoms and of the stools, together with a knowledge of all the resources is absolutely necessary for successful treatment. Often breast milk is the only salvation, and it should be resorted to much more frequently than it is. Once I had to put a child back upon breast milk who had been weaned for five months and who had already cut eight teeth. The change proved lifesaving after other resources had failed.

In addition to the careful management of the feeding in these cases of nutritional disorder one must not forget the general hygiene of the baby, particularly with reference to fresh air, sunlight, quiet sleep and freedom from excitement and from too frequent, we meant but misdirected attention. In hospitals it is probable that the so-called "hospitalism" of young babies is due largely to the lack of "mothering." Here the babies are kept for too long a time lying in their beds as they fail to receive the normal amount of manipulation and massage, of comforting change of position, that is given in every baby's life at home.

The other great department of pediatrics to which physicians should devote more attention is *infant hygiene*. A stream can rise no higher than its source. If the nation's mothers and nurses are to take intelligent care of our babies the physicians of the nation must have a thorough and practical knowledge of the babies' needs.

Those who come in contact daily with babies in comfortable or luxurious homes, as well as with hospital and tenement house babies, see constantly the evil results of bad or misdirected feeding and care, and for them no argument is required as to the need, in every medical school and hospital, of special instruction in infant hygiene. For those, however,

who do not appreciate the ramification of the subject, a few important considerations may be mentioned.

Special education in infant hygiene is a necessity, because, in the first place, the mortality among infants and young children is higher than at any other period of life. More than one quarter of the total deaths of the community occur in children under the age of three years. From 10 to 25 per cent of infants born alive die during the first year, 7 per cent more during the second year, and 3 per cent more during the third year; so that, of 100 new born babies, from twenty to thirty will be dead, under ordinary conditions, by the end of the third year. This is bad enough, for even an old man of 84 years has a better chance of living another week than has the newly-born infant. But if we should add to these deaths the 5 per cent still-born, and the large number of pregnancies (about one-fifth I am reliably informed) that result in miscarriages, the figures of infant loss are simply astounding.

Knowledge in infant hygiene will save babies' lives by lessening infant deaths.

A second reason for special attention to infant hygiene is, that the public needs and demands physicians who are well instructed in the care of babies. The birth rate among the better classes of every civilized nation is diminishing, and this makes the individual baby, if possible, more precious to the family and to the State. Moreover, physicians are needed for the increasing number of milk stations and consultations for infants as well as for special babies' clinics and hospitals. At present it is difficult to find medical men with the proper training and experience for this work, and philanthropic societies in many of our cities are already complaining of the poor medical advice given in their infant welfare work.

In this connection must be mentioned the need of nurses trained in infant hygiene. There is an immense and growing demand

for such nurses. A wave of interest in social welfare work is now spreading over the whole civilized world, and now, in the United States, almost every small town has its social service bureau, with one or more district nurses. The principal work of the nurses relates to child-birth, infancy and the diseases of childhood. The weakest link in this chain of philanthropy is the dearth of women sufficiently experienced in infant feeding and hygiene. Facilities must be provided for educating such women, and it devolves upon physicians to give this instruction.

Another reason for special education in infant hygiene is the increased interest in and knowledge of infancy on the part of the laity. The numerous booklets, the prize baby contests and infant welfare work and exhibitions have increased greatly the general body of knowledge of infant hygiene, especially among our young women.

If the physician is to hold his own proper place in the estimation of the community he must speak with authoritative knowledge on this subject—he must know more than the grandmother or the old nurse, more than the little "guides to mothers" or the patent food circulars, and must be able to give special advice for the individual case or problem.

What are the most important topics for consideration with regard to infant hygiene? An answer to this question may perhaps best be reached by first enumerating the problems to be attacked. We have, first, an enormous mortality before the normal time of birth, due to miscarriages, prematurity and still births. An investigation made in Philadelphia showed that in 1911 there were 39,975 babies born, and of these 2,131, or about 5 per cent, were still born. There were also 559 premature births in which the baby died, and there were during the same year 10,666 miscarriages. I questioned these statistics, but found on inquiry that they had been made up by Drs. Hirst, Norris and Borchard, of Philadelphia. They estimate the miscarriages and still births

as being almost one in every four pregnancies. This means that one out of every five of these pregnancies resulted in a miscarriage or still birth. Just think of the blasting of hopes, the discouragement of womanly effort these figures imply! Something must be done to prevent this enormous loss of life before its portals are fully entered.

Secondly, we have a very large mortality during the first few days and weeks of life. The health officer of Washington has stated that in 1911, out of 957 deaths in the first year of life, 151 occurred on the first day, 130 between the first and seventh days, and 114 between the seventh and thirty-first days; that is, 395, or about 40 per cent of the deaths of the first year occurred during the first month and about one-sixth on the first day. These figures were not exceptional, for in 1910, out of 1,070 deaths, 150 occurred on the first day, and in 1909, out of 1,042 deaths, 140 occurred on the first day. So we can set down one-sixth of the mortality of the first year as occurring on the first day, and almost one-third of the first year mortality as occurring during the first week. This first week's mortality is not due to the milk or the manner of feeding, but to earlier acting causes, such as hereditary weakness or disease, malformations, difficult or mismanaged childbirth and septic infection.

Thirdly, we have a large mortality during the remainder of the first year. This is due to difficulties with nutrition and to infection—particularly to gastro-intestinal and respiratory diseases. Along with this mortality there goes, of course, a morbidity whose prevention is possible to a large degree. A few statistics are of interest in this connection.

Prausnitz records that in 1900 in certain German cities, of 1,000 live born infants there were 225 deaths during the first year, and that of these more than one-third were due to gastro-intestinal disease. He records also the difference between the legitimate and illegitimate infants—the legitimate having a mor-

tality during the first year of about 25 per cent, while the illegitimate had a death rate of 50 per cent. Foundlings showed a death rate during the first year of 66 per cent or over.

Of 10,000 infants nursed at the breast, there died during the first year of life, 580; of 10,000 artificially fed babies there died 4,588, that is to say, the breast-fed baby *has almost nine times as many chances for life as has the baby artificially fed.* This is the most important fact with reference to mortality and morbidity during the first year of life—that over 85 per cent of the mortality occurs in babies that are artificially fed. Manifestly the most important factor in baby-saving is to have the baby nursed by its own mother.

What measures must be taken to combat this waste of infant lives? To prevent the enormous premature mortality we must not only endeavor to bring about in the community the knowledge and the application of the findings of the new science of eugenics or racial hygiene; but there must be prenatal supervision by the physician with care of the mother by a nurse, and assistance from the State, if necessary, to prevent overwork and undernourishment. There should also be instruction of expectant mothers and of growing girls.

To reduce the high mortality of the first few days there must be better obstetrical care of the mother and baby at the time of delivery, and good nursing and feeding of the mother to promote nursing. Premature and feeble infants require especial care, together with breast milk, as a rule.

To reduce the mortality and morbidity of the first year the primary consideration is maternal nursing, though properly modified milk constantly adapted to the baby's needs may be used as a substitute when breast milk is not obtainable. Nursing by the mother is almost always possible if proper care and encouragement are given to the expectant mother. In an extensive experiment made by Dr. Schwartz in

New York, it was found that among 1,501 cases, 96 per cent of the mothers could be taught to nurse their babies for one month or less, 88 per cent nursed their babies for three months, and 77 per cent for six months. How much this means, for every drop of breast milk helps not only to nourish the baby but to develop and increase its digestive capacity for other milk or foods.

In order to promote nursing, preliminary care of the nipples is frequently necessary, and to prolong the nursing the mother's comfort should be considered, especially as regards her sleep at night. This can be done by making the nursing periods regular and at least three hours apart by day, with only one feeding at night; moreover, after three months an occasional bottle-feeding may be given, and in many cases the intervals can be lengthened to four hours. Every physician should appreciate the importance and understand the technique of maintaining breast-feeding as long as possible.

On the continent of Europe pediatrics has long been recognized as a specialty; not only have special journals for children's diseases been published for several decades, but the medical faculties have had special departments with full professors of pediatrics and special hospitals for teaching and research. Among the new university hospital buildings in Vienna the children's clinic occupies as prominent a position, and, with its contagious pavilions, covers more ground than the new medical clinic.

As in other English-speaking countries, the medical profession of the United States has been conservative about recognizing that pediatrics is a full grown specialty, but fortunately in the past twenty years a great change has taken place, and this subject is now being separated from general medicine and from obstetrics, in which some parts of the subject

were formerly taught. Chairs of pediatrics with a full corps of assistants have been established in all the best medical schools and as rapidly as possible hospital bedside instruction is being given in infant feeding and hygiene as well as in the diagnosis and treatment of the diseases of childhood.

But tradition still holds strong with regard to the curriculum and it is difficult to obtain the requisite time for a proper presentation of the subject. The greatest and most promising field for the prophylactic medicine is that of infancy, so that it would seem that the medical schools might well revise the curriculum so as to devote definitely more time to the study of these problems of infant mortality and morbidity. I feel strongly that in many schools a part of the time assigned to anatomy could with advantage be devoted to pediatrics, and especially to the consideration of infant hygiene. By so doing a special interest would be added to the subject of general hygiene; for infant health is the yard stick of community hygiene. In matters of hygiene, what is best for the baby is best for the race.

113 East Sixty-first Street, New York City.

DISCUSSION.

Dr. James D. Love, Jacksonville, Fla.—Dr. La Fetra has left nothing unsaid that should have been mentioned in his paper. Personally, I feel under great obligations to him for appearing before us, and since my practice is limited to diseases of children I feel that my position has been fortified by the contentions that have been brought forward by him. The practice of pediatrics is a specialty in the South which is comparatively new. As far as I know, there are less than twenty-five men in the South who devote themselves exclusively to this branch of medicine. I hope this address will arouse interest in the practice of pediatrics, because more of you I think should devote more time and attention to this important branch of medicine. It is a difficult matter for pioneers in this work to secure the cooperation of the community that would be possible were more of us actively interested in this particular branch of medicine. Therefore, I hope and believe Dr. La Fetra's address will do much good in the way of stimulating an interest in this movement.