

## **The value of fruit juices in infant feeding / by George Dow Scott.**

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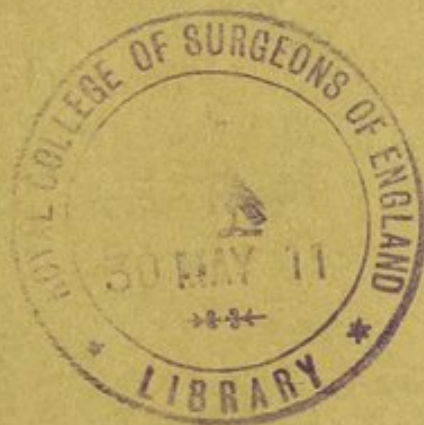
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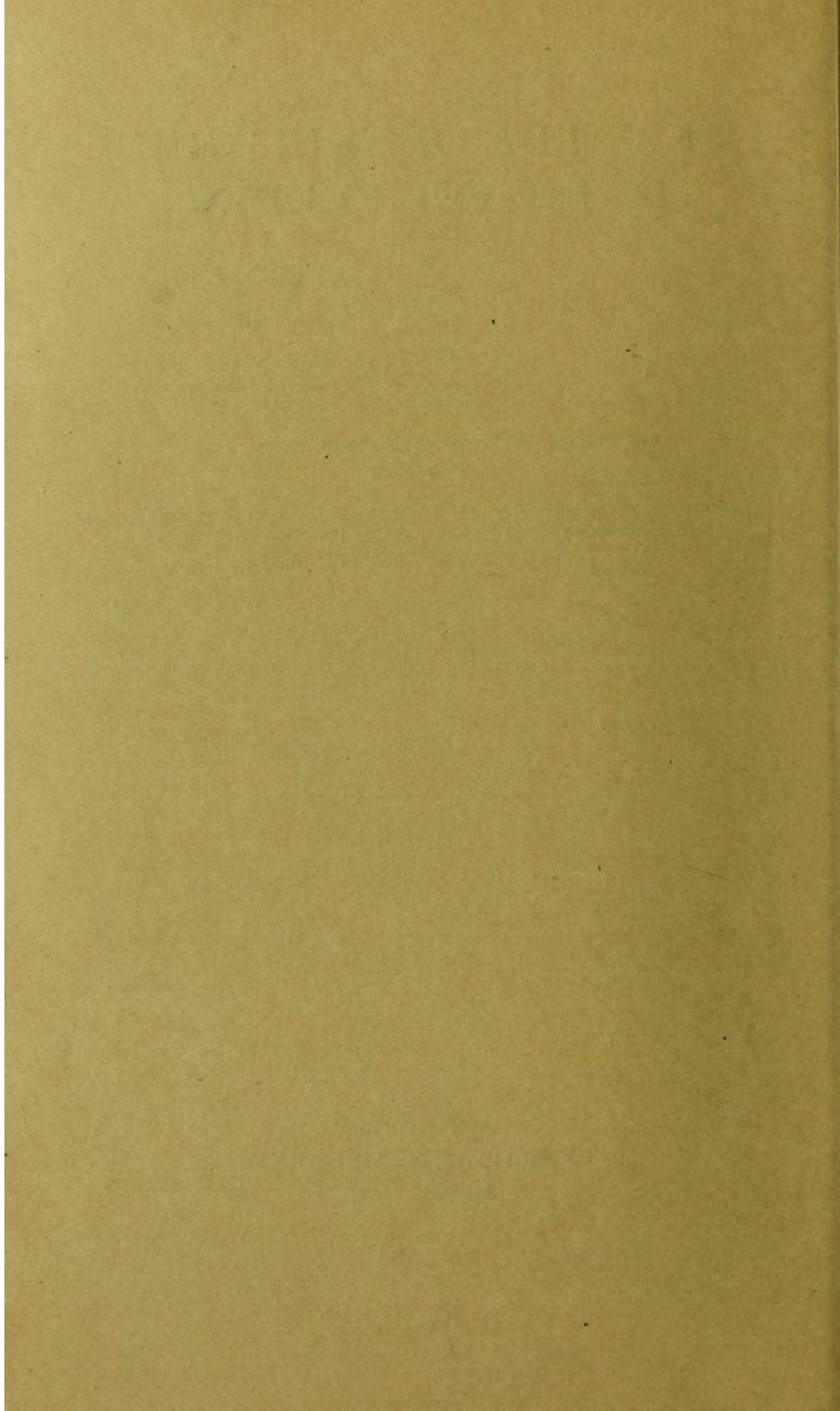
# THE VALUE OF FRUIT JUICES IN INFANT FEEDING

By  
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## THE VALUE OF FRUIT JUICES IN INFANT FEEDING\*

It is to be regretted that physicians, particularly pediatricists, have so little real knowledge of fruits and their juices in relation to their aid in digestion. Such a study might well be a fertile subject for investigation.

The use of fruit juices in the infant dietary has been under investigation by me for many years. The value of fruit in disease has been known from time immemorial, from the period of Dioscorides and Pliny. What little scientific investigation has been undertaken within the last few years has been done mostly by the Germans. As far back as 1750, according to Geoffrey, Forestius had a severe diarrhea which he apparently cured by the use of overripe pears. The great Linnæus himself, a sufferer from gout, benefited himself by a strict fruit régime. At the period of our own Civil War obstinate cases of bowel trouble were cured by eating peaches, the improvement being attributable to a correction of a scorbutic tendency.

Looking over old literature on this subject I found that one writer believed that grapes promote the secretions without irritation of the intestinal canal, reconstruct the blood, exercise a salutary action on the nervous system and favor the formation of fat.

Modern writers believe the laxative effect of fruit juices superior to the more purgative mineral waters, being beneficial in constipation, in faulty digestion and excellent in non-organic liver and spleen congestions, as well as in anemia and chlorosis. Abroad the grape cures result in giving the patients a sense of well being, of more than ordinary feeling of strength and agility. These grape cures are said to relieve the vomiting and retching of an acid stomach and influence greatly acute and chronic diarrheas, increase the urine output and diminish the acids and salts of the urine as seen in gouty conditions.

Appreciating the value of fruit juices in infant feeding and in infant life, we are astonished at the unwise and empiric use of drugs and medicines during the first twelve months after birth. Castor oil, calomel, and other medicines should be given at this period for a very short time and only in very small doses. Infants at times do need a laxative other than the milk fat. The normal breast milk contains fat, proteid, and carbohydrate plus vitality sufficient for the given infant. A *normal* mother's milk is ideal for her own child. This is not the case with either poor mother's

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milk or artificial modifications of milk. In fruit juices we have an ideal laxative, as well as an ideal antiscorbutic.

Certain authors divide fruits into two great divisions: flavor fruits and food fruits. The former contain certain vegetable salts of potash, the latter, as the fig and banana, contain a carbohydrate in the form of a sugar called levulose or fructose, which is found in apples, apricots and pineapples, which contain also cane sugar. This levulose is ideally and wonderfully suited to delicate stomachs, much more in fact than is cane sugar.

In passing, let me say that in gouty subjects this fructose is a very great aid in the digestion of foods. Hall, on the other hand, divides fruits into three great classes: acid fruits, sweet fruit and bland fruits; the sweet fruits contain so much sugar that none need be added. Bland fruits are those neither acid nor sweet. When subjected to boiling the gums of many fruits yield a jelly. Cooking renders most fruits more digestible by softening their cellulose and also converts the gums into a gelatinous form. The digestibility of cooked fruit juices in the stomach and small intestine is dependent largely upon the nature of the fruit and the degree of ripeness before cooking. Cooking, let it be said, does not change the chemical composition of the fruit to any great extent, the loss being a few volatile constituents. These juices undoubtedly purify the intestinal canal and render it an unfertile field for the propagation of bacteria.

The general composition of fresh fruit is as follows:

Water, 85 to 90 per cent.

Proteids, 5 per cent.

Fat, 0.5 per cent.

Carbohydrate,  $5\frac{1}{2}$  to  $10\frac{1}{2}$  per cent.

Cellulose,  $2\frac{1}{2}$  per cent.

Mineral matters, 0.5 per cent.

Of the proteid 80 per cent. is absorbed; of the fats 90 per cent., and of the carbohydrates 95 per cent.

Following out the classification of Hall we find under the acid fruits, lemons, limes, grape fruit, oranges, cranberries, currants, and pineapples.

Under sweet fruits are found figs, dates, prunes, and dried raisins.

Under bland fruits are found pears, grapes, blackberries, melons and bananas.

The acid fruits are valuable for their acids and organic salts, existing mainly in combination with alkalies, as the citrates, malates, or tartrates of potassium, sodium, magnesium and calcium.

When these fruit juices are taken into the digestive canal they are readily absorbed and carried with the absorbed food to the liver, where the acids and the acid elements of the organic salts



are oxidized, releasing the potassium, the sodium and the magnesium, etc., which are changed to carbonates, thus increasing the alkalinity of the blood.

These alkalies are eliminated by the kidney, hence the diuretic action. The acid fruits are, of course, markedly diuretic. Bland fruits are used more for their appetizing flavors.

Sweet fruits are the ripe fruits where in the ripening the cellulose and tannic acid of the unripe fruit are changed to sugar and fruit juices. The excess of acids in the unripe fruits leads to irritation of the stomach and intestines, causing colic and diarrheas. If, however, the cellulose and the acids are in more moderate quantities, as in ripe fruit, a gentle stimulation on the intestinal wall is exerted.

Professor Sheridan reports his conclusions in a series of experiments upon the digestive qualities of certain fruits, such as the fig, pineapple, melon, banana, apple, orange, also lettuce and the dandelion, and finds that the enzymes or ferments in the juices of the plants peptonize the higher proteids and are also proteolytic.

Coming now to my own findings, I will say that the use of fruit soups is a most important one. I have found them to be excellent in infants feeding.

These soups are made by boiling fresh or dried fruits in water and sugar, pressing and straining through two layers of clean muslin cloth, and serving warm with more sugar if necessary. The juice will contain albuminates, carbohydrates and organic acids. Although the cooked fruit juices contain all the essential conditions and ingredients of the raw juices, yet they lack the volatile elements which might be called the life of the fruit, the stimulating effects, which are so pleasing and so refreshing.

At times in very young, and in even somewhat older infants, skin eruptions may be caused by the ingestion of unripe or overripe fruit or sour fruit juices (strawberry, orange), when the infant's stomach is disordered and inflamed from faulty milk modification or where the fresh juices and the milk have been given together, causing at times colic from faulty digestion.

Certain infants may have an idiosyncrasy to such juices, although I have never observed it.

Bearing these facts in mind, I begin by giving cooked fruit juices to the nursing infant soon after birth if necessary, and continuing their use until the mother's milk shows a proportionate amount of proteid, carbohydrate and fat and the normal development of the infant is assured.

If the infant can take the raw fruit juices of the orange or pineapple, my favorite juices—the pineapple juice containing peptogenic and digestive properties—it is well to begin by giving



one-half dram juice and one-half dram boiled water, plus cane sugar, once a day, one-half to one hour after milk feeding, gradually using the plain pure juice once, then twice, then three times or more daily without water, but with the addition of cane sugar.

In the country where oranges and pineapples are few the crushed fruit juice of the sweet grape, the juice of blackberries, raspberries, blueberries, and ripe raw pears without their cores and pressed through two layers of clean muslin cloth serve their purpose well.

The use of the fruit juices can be pushed according to the desire, the stools of the infant, the amount of urine excreted, and according to the general condition of the infant; and long after the infant is well the juices can be continued as an efficient mild tonic.

Drugs and medicines, as I have mentioned before, are almost always borne poorly. Efficient as these juices are to the nursing, they are even more valuable to the bottle-fed infant. Malnourished infants suffering from acute, subacute, autointoxic affections, intestinal disorders and from stomach and intestinal fermentation, from loss of weight, from dietetic eczemas and constipation are brought back, with the aid of these juices and a proper modification of milk, to health.

Many cases diagnosed marasmus, really extreme malnutrition, with faulty digestion and weakened assimilation, as seen in cases of rickets, scurvy and rheumatism, can be brought back to the normal or near-normal unless there is some underlying cause, such as inherited syphilis, tuberculosis, or the effects of chronic alcoholism in the parents, with the aid of these juices.

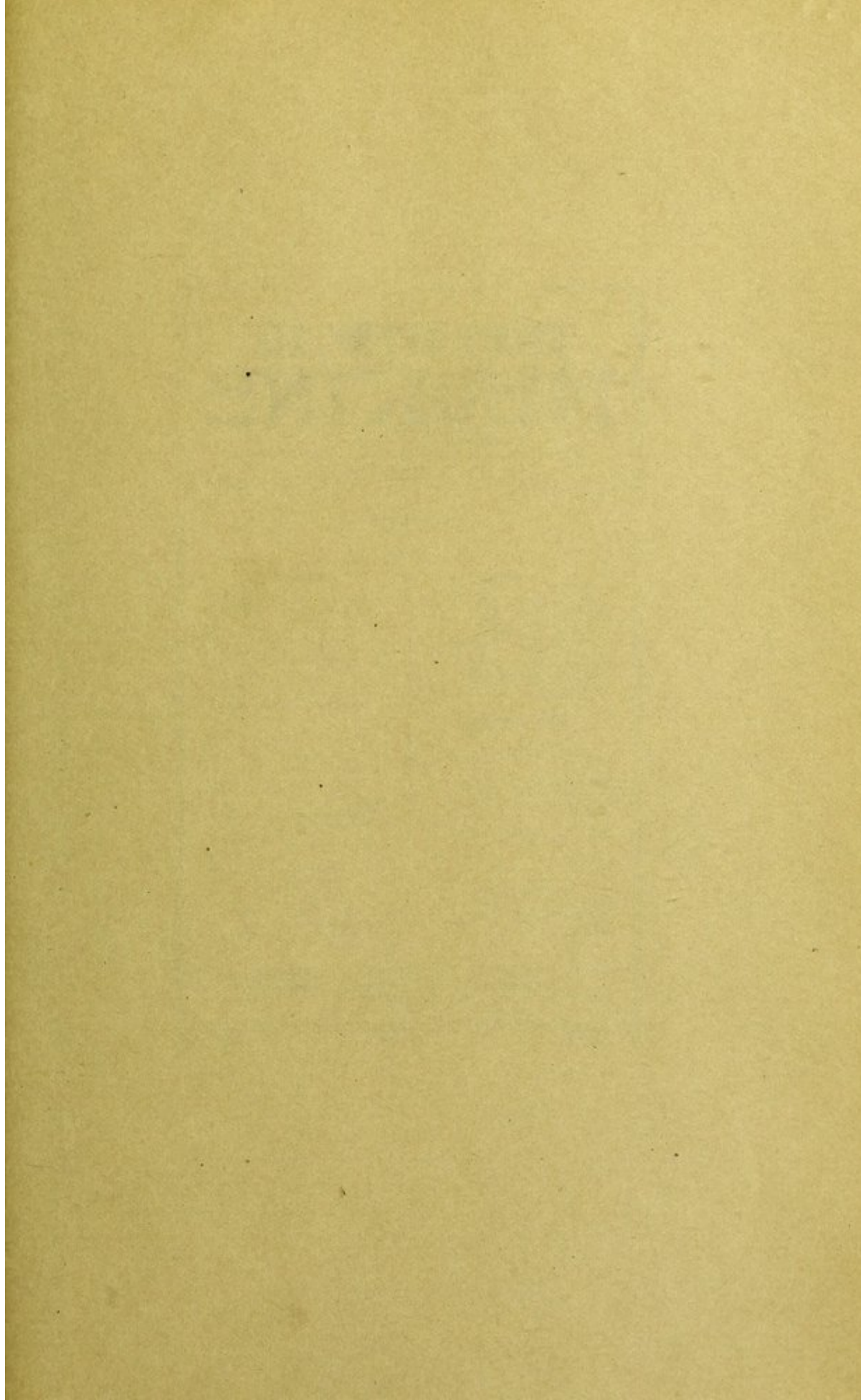
In infants suffering and convalescing from broncho-pneumonia, lobar pneumonia, intestinal diseases, influenza, measles, pertussis, scarlet fever, simple anemia, simple catarrhal jaundice, etc., fruit juices are well borne, and they favor digestive assimilation of foods, the diuretic action of the kidneys and the cleansing of the enteric tract.

For the same reason they are useful in syphilis, peritonitis, appendicitis, bronchitis, acetonuria, diphtheria, typhoid, auto-intoxications, etc., while primarily they show a decided action in flushing the kidney and the urinary tract as well as possibly diluting the toxins which pass out by way of the kidney. This direct action can be understood in pyuria, anuria, hematuria, acute nephritis, pyelitis, cystitis, and passing albuminurias.

It is with the hope that more may be learned of these juices, their chemistry, their specific uses, their indications and their contra-indications that I bring my results and conclusions before you.

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