reason of the relative failure which however must be a rare thing because it is difficult to see how naturally the relation can change much after middle life. Before discussing which gland or glands are probably at fault in a given case it is interesting to consider how the relative failure might have come about.

We know that overexercise always results in premature decay. A brain, a muscle, a blood vessel, a kidney cannot do too much work without resulting premature failure. Suppose then that a pituitary gland, for example, has for a long time been given more work than its fellow ductless glands. It will surely fail sooner than the others. Let us consider what this overwork might be. We know that the pituitary gland has a great deal to do with the proper growth and development of the skin. Now suppose the skin of the lip at a certain spot is for a long time and persistently injured by a hot pipe stem. The pituitary gland is presumably working overtime to repair this injury. Finally it can no longer do this and attend to its other duties because it is getting old and failing naturally. But it is failing faster relatively than the other ductless glands because it has had extra work for a long time. Though apparently a fanciful speculation, this is, I believe, really a factor, perhaps an important one, in the production of cancer of the lip. As to why in this case the cancer starts in the lip, it is not enough to say that it is because there has been trauma. It is common knowledge that cancer very often starts at the site of an injury, especially an injury long continued, repeated and generally mild as regards each individual act of injury. It is the repeated-drop-of-water-wearing-away-a-stone idea. This is not enough, for cancer does not always, nor indeed often, relatively, occur even at such a site. Put the two factors together, however, and the explanation seems more complete: the repeated injury and the failure of the particular ductless gland that controls the normal nutrition of the injured part. Nor is this yet enough. Why should any cell reproduce its kind at a time of life when all body cells are on the down track and physiologically dying? It seems an anomaly. Furthermore, except only the skin and squamous epithelium and possibly some columnar epithelium, which are not very common seats of cancer, none of the body cells subject to cancer can normally reproduce themselves after the period of beginning physiological death has arrived. No glandular cell once destroyed can be replaced by its neighboring gland cells at such a period. These are all highly specialized cells and have lost their original reproductive power, or rather delegated it to other special cells in the generative glands which are the real hereditary individuals. In the cells producing the spermatozoa and the ova reside the only real continuous life. All the somatic cells live as long as the individual only. They are creatures of a day, serve their purpose and die. The life is continued,

reproducing, with all its inherited traits, only through these comparatively few highly specialized generative cells. And here is the anomaly: in cancer we have body cells abandoning their specialized functions and returning to the essential primitive function of all living things, reproduction; and that too when theoretically they should be physiologically dying. Therefore, there must be some factor other than failure of some ductless gland or glands, and trauma. I believe the explanation to be either one or both of two events. In the first place it seems highly probable that cancer *always* occurs at the site of cell injury for the following reasons:

1. Cancer certainly does occur often at the site of a known injury.
2. Organs which are most protected from injury are the rarest seats of cancer.
3. Organs which are most exposed to injury are the commonest seat of cancer, with one enlightening exception,—the skin.
4. The skin. But even here, remember that skin cancer is commoner by far in men than in women; men are far more exposed to skin injury than women. The reason why cancer of the skin is rare in spite of frequent injury will appear later.
5. Even those organs, apparently well protected, which occasionally are the seat of cancer may conceivably be injured, *e.g.* the kidney by stone, and the liver ducts similarly. Also it is confirmatory of this idea, that cancer of the gall bladder and the ducts is far commoner than of the liver itself.

(To be continued.)

MEASURED FEEDING FOR OLDER CHILDREN.*

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THE feeding of infants has become an art made possible by percentage feeding of milk and other foods, the constituents of which have been determined with almost absolute precision. Indeed exactness has been carried to such a degree that sometimes the physician's judgment is led astray by laboratory analyses. In the case of older children this condition does not obtain. In fact food is prescribed by the physician in most indefinite terms or else not prescribed at all. Such expressions as "Give the child good, nourishing food and plenty of it" or else "Be sure the child does not take anything indigestible" disposes of the whole question. Sometimes the physician may ease his conscience by adding

* Paper read and food exhibit shown at the meeting of the Suffolk District Medical Society, Jan. 22, 1913.

"Not too many sweets and no tea or coffee." It seems superfluous to state that this method of dealing with the diet of the growing child is a poor one, but it is met with so often that it demands most serious attention. Someone has well said "Why do physicians exercise so much care in prescribing drugs that are administered only occasionally and so little care in prescribing food which is taken daily." This neglect of the proper supervision of the feeding of older children is responsible for many serious diseases of early life and especially for many disturbances of the nervous system that are most difficult to remedy.

For the proper feeding of the child both physician and parent should have an adequate knowledge of food and food values. Three principal methods are in use for measuring food. In one all food is divided in portions of 100 grams and tables made out for the caloric values of each portion. This method is not readily adopted by either physician or parent, as it requires a mental readjustment of values which is a serious obstacle to its success. We buy food by the ounce or pound. All infant feeding in this country is by ounces. The change into other standards of measurements renders the method impractical except for laboratory work. A second method consists in adopting the ordinary serving as a unit of measure. This method is incorrect because what is an ordinary serving for one person is not so for another. This method also lacks an important factor present in the other two methods—namely, that of comparison, which is a great aid to memory. The third method, proposed by Irving Fisher in 1906, is called the calorie per cent. method. Prof. Fisher prepared tables indicating the amount of food necessary to furnish 100 calories of food value, such amounts being used as standard portions. For example, one slice of bread has a value of 100 calories; also one pat of butter or the lean meat in a lamb chop, or five ounces of milk or one slice of bacon. These units or multiples of units represent very closely the amount ordinarily taken at one serving, so that food can readily be served according to this plan. It gives at first hand, comparisons that help fix food values in the memory, the knowledge of a comparatively small number of which is sufficient to cover all our needs in any particular case. Sufficient information can be given in a short conversation to enable a person to raise or lower his diet 500 or 600 calories daily, which is an amount sufficient to cause a gain or loss in weight as desired.

For a child who is six to fourteen years of age, ten to twenty pounds under weight, and who continues his usual occupations, between two and three thousand calories of food per day are necessary for proper gain.

Having then a practical measure of food values, in order to make a child gain or lose body weight, the following steps are necessary: In the first place we must secure the co-operation of the child. This can be obtained by what Dr. Morton

Prince calls painting pictures. All girls want to be attractive and beautiful. They also want to do as other girls do, dance, swim and play tennis. Every boy wants to be athletic. The desire to play baseball and football can always be aroused in him sufficiently to cause him to do almost anything to gain a good physical condition for that purpose. Next there must be a sufficient control of the patient by parent or other person acting "in loco parentis" to secure a record of food taken and a regular report at stated intervals. The method I have found to work to greatest advantage with these older children can perhaps be best shown by the following case.

Thomas R., aged fifteen years, was a boy active in mind and body. He was ten to fifteen pounds under weight. Examination showed good physical development, all organs entirely normal. He was told that in order to make a good showing in athletics he ought to gain fifteen pounds. He at once said he was willing to follow any directions if he could gain, especially as he was going into a summer camp and wanted to stand well with the other boys. He was directed to keep a 48-hour list of all the food he ate and report at the end of that time. The 48-hour list showed the following points. The boy took no cereal, practically no milk, cream or butter. His average 24-hour amount was 1400 calories. He was told it was impossible for him to gain on that amount of food, that he must take at least 2000 calories. Asked why he took no butter he replied, "Why, does butter make any difference." He was surprised to know that a pat of butter was of equal value to a slice of bread. He did not like ordinary cereals, but he liked Pettijohn's breakfast food. He did not like milk but could take graham crackers and milk. Accordingly he was told to take butter and Pettijohn's daily, to take crackers and milk at 3.30 p.m. and before going to bed at night, to keep an accurate record of each day's food, and to report in a week.

At the end of the week his report showed he had followed the suggestions given and had averaged 1800 calories daily. His gain was two pounds. Encouraged by this gain, the following week he averaged 2100 calories, and gained two pounds more. The next week his average was 2180 calories and he gained three pounds, seven pounds in three weeks. At this visit he remarked "It does not matter what I take, does it, if I take enough." He said the day previous he found at night he had taken only 1500 calories, so he sat down and ate seven large figs, which raised his total to 2200. No indigestion resulted. The following week he kept no record, saying he just ate all he could and let it go at that. There was no gain in weight. The next week he did the same with no gain resulting. He then resumed keeping his record, which showed nearly 2200 calories. His gain was one and one-half pounds, making a total of eight and one-half pounds in the four weeks in which he kept his record of measured food, or an average of over a quarter of a pound per day. This boy took very little milk and no cream during this time, but was fond of nuts and figs. His average gain is what should be expected in a healthy boy. No change was made during this time in his occupation or habits. If he had not gained on 2200 calories it would have been strong evidence that he

had some organic disease, possibly some mechanical obstruction to respiration, or that he was suffering from toxic absorption, possibly from tubercular glands, or from diseased tonsils. That is, the failure of a child to gain on a measured diet of 2000 or more calories per day is a valuable point in diagnosis.

The preliminary record is of importance in this method of feeding. First, it shows how much food is habitually taken; second, it shows the kind taken; third, and more important still, it shows what the child likes and dislikes making it possible to retain such foods in the diet as are agreeable to the child, simply substituting others for those that should not be taken, thus working along lines of least resistance, a most important factor in successful feeding. In the case of delicate girls, likes and dislikes, aversion to form, taste or smell, or associations of certain foods with unpleasant events, may be almost insurmountable obstacles in securing proper nutrition. Their appetites are fickle, leading them to live almost wholly on carbo-hydrate food, the proteid being far too low for proper growth. Cause and effect form a vicious cycle often made evident by this simple preliminary list.

The 48-hour record may also show mistaken ideas of parents as regards feeding. They frequently exhibit a certain pride in thinking that what does not agree with them will not agree with their children. Mistaken ideas of food values may lead to the total exclusion from the diet of many important articles of food.

During the past year a girl of fifteen came under my care because she was undersized and delicate. For ten years she had taken almost daily a large order of clear soup, the stock of which was made from the most expensive cuts of meat, the father thinking it especially nutritious. After taking a serving of such soup she ate very little else, so that her 24-hour ration was lessened by an appreciable amount. Neither parent nor physician seemed to realize that it requires nearly a quart of such soup to yield 100 calories.

Having from this 48-hour record a knowledge of the kind of food taken and its amount, it is an easy matter to increase or decrease the 24-hour intake by simple changes. For example, a girl of nine was twenty-pounds under weight. Her 24-hour amount before any suggestions were made to her about her diet was 1400 calories. Her breakfast consisted of four tablespoonfuls of cream of wheat, two teaspoonfuls of sugar, two soft boiled eggs, one roll, one-half pat of butter, and one cup of tea, making a total of 550 calories. (See table I.)

TABLE I.

		Cal.
Cream of wheat	4 tbsp.	100
Sugar	2 teasp.	50
Eggs (soft boiled)	2	200
Roll	1	100
Butter	½ pat.	50
Tea (milk and sugar)	1 cup	50—550

By adding cream to the cereal and by having the eggs scrambled, which allowed more cream and also butter, 250 calories were added to the breakfast. By substituting a cup of cocoa instead of the tea 200 calories more were added, together practically doubling the food value of the meal. (See table II.)

TABLE II.

		Cal.
Cream of wheat	4 tbsp.	100
Cream (16%)	2 oz.	100
Sugar	2 teasp.	50
Eggs (scrambled)	2	
cream	1 oz., butter	350
Toast	1 slice	100
Butter	½ pat.	50
Cocoa	6% oz.	250—1000

Similar changes were readily made in the other meals, thus raising the 24-hour amount to above 2500 calories, an amount necessary to cause the child to gain from one to two pounds a week.

Such changes do not force the child to take too much food at any one meal, and, therefore, there is little danger of causing indigestion. In fact, in following delicate children with measured feeding I have seen no case of indigestion result. Children under weight seem to have a remarkable ability to digest food, taking as high as 3500 calories without digestive disturbances. While on the other hand, in the case of children who are overweight, symptoms of indigestion disappear in a remarkable manner with a diminution of the day's ration.

Measured feeding shows almost invariably that a child without organic disease is underweight because he does not eat enough and overweight because he eats too much. It is a far too common occurrence to find children taking tonics, transported to different climates, given all kinds of treatment, to make them gain in weight, when a measurement of their food shows they are taking from 1000 to 1400 calories daily, an amount too small for them to possibly gain unless actually confined to bed.

In health the question of a proper proportion of protein, fat and carbo-hydrates, namely that of a balanced diet, needs attention only in a general way, as taste regulates this in most instances. For example, bread which represents protein and carbo-hydrate, requires butter (fat) to make it palatable. Meat, composed of fat and protein, requires potato (carbo-hydrate) to please the taste. So the combination of bread and butter, meat and potato, bread and milk, represent physiological needs that taste recognizes and controls.

TABLE III.

		P.	F.	C.H.	Cal.
Cream of wheat	4 tbsp.	12	3	85	100
Cream	2 oz.	7	84	9	100
Sugar	2 teasp.	0	0	50	50
Eggs (scrambled)	2 tbsp.	68	278	4	350
Dry toast	1 slice	13	6	81	100
Butter	½ pat.	0	50	0	50
Cocoa	1 cup	34	128	88	250
Total calories		134	549	317	1000
Total grams		33	59	78	

In cases of nephritis, diabetes and duodenitis with jaundice, measured feeding applies to the different elements of food equally well as to the total quantity taken.

CONCLUSIONS.

The diet of all improperly nourished children and occasionally of well nourished children should be checked up and controlled by measured feeding.

A preliminary 48-hour list, kept without any suggestions from the physician, shows the quantity and kind of food habitually taken as well as the likes and dislikes of the child.

Changes in diet should be made gradually along lines of least resistance.

Cooperation of both child and parent is necessary for successful feeding. Both should be disabused of ideas and prejudices which interfere with proper nourishment.

The average gain on diet alone of children who are under weight should be from one-half to two pounds per week. If no gain is made, organic disturbances or toxic absorption should be suspected.

Serious errors in diet cannot be detected by asking the child about his appetite or the mother about the diet given. Food must be recorded and measured in order to show how much is taken.

Almost invariably the overweight child is overweight because he eats too much, and the underweight child is underweight because he eats too little.

Measured feeding is an important therapeutic test.

This exhibit shows about sixty common foods of the same nutritive value (100 calories). The labels have 100 small squares marked on them and the proportion of proteid, fat and carbohydrate is shown in colors, protein red, fat yellow and carbo-hydrate blue.

Liquid foods, as beef juice, orange juice, consommé, milk modifications, cream, etc., are put in bottles and preservatives added. Soap is used to represent butter and cheese. Meat and fish are represented by clay models. Artificial fruits were obtained in many instances of the proper size at shops where they are sold as favors. Dry foods, as shredded wheat and crackers, require no substitutes.

By studying the exhibit it is readily possible to visualize the amount of each food necessary to make 100 calories. For example, it requires nearly one quart of consommé or one whole bunch of celery or five ounces of milk to equal in value one pat of butter or one egg or the meat in an ordinary lamb chop.

On the right side of the upper table are three sets of graduates. The left set shows the amount of protein (60 grams) fat (40 grams) carbo-

FOOD EXHIBIT.

hydrate (250 grams) required in 24 hours by the average child six to ten years old (Koenig). The middle set shows the amounts required by an adult woman (Koenig). The right hand set shows the amount of protein (160 grams) fat (125 grams) carbo-hydrate (550 grams) taken by a child of nine years, a member of my feeding class, who was under weight twenty pounds but gaining rapidly, the total being more than double the amount taken by the adult woman.

Table I shows the breakfast of a girl aged nine before any suggestions were made as regards her

diet. Table II shows breakfast modified by suggestions made to increase its caloric value. Table III shows the number of grams of proteid, fat and carbo-hydrate taken with each article of food. Table IV shows first part of a simple list of food (in preparation) to be used for practical reference in computing 24-hour amounts.

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List of foods shown in exhibit giving weight of 100 calories of each in grams and ounces; also showing the calories in each represented by proteid, fat and carbohydrate.

FRUIT.

	Weight.			Calories.		Total.
	Grms.	Oz.	P.	F.	C. H.	Cal.
Orange, one very large.....	270	9.4	6	3	91	100
Apple, one large.....	206	7	2	6	92	100
Pear, one large.....	173	5.4	4	7	89	100
Banana, one large.....	100	3.5	5	5	90	100

CEREALS.

	Grms.	Oz.	P.	F.	C. H.	Total.
Bread, white or brown, full slice.....	38	1.3	12	16	72	100
Rolls, French or Vienna, one.....	35	1.2	12	7	81	100
Zwieback, 3 slices.....	23	.9	9	21	70	100
Crackers, Uneeda Biscuit, four.....	24	.9	9	20	71	100
Crackers, Graham, three.....	23	.8	9	20	71	100
Force, 6 tablespoonfuls.....	30	1.1	10	3	87	100
Shredded wheat, one.....	27	.9	13	5	82	100
Grape nuts, 3 tablespoonfuls.....	27	9.6	13	2	85	100
Cream of wheat, 4 tablespoonfuls.....	156	6	12	3	85	100
Macaroni, 4 tablespoonfuls.....	110	3.8	14	15	71	100
Wheat or barley flour.....	27	1	12	3	85	100

MEAT.

	Grms.	Oz.	P.	F.	C. H.	Total.
Lamb chop, edible part.....	50	.96	24	76	0	100
Steak, tenderloin, size chop.....	35	1.3	34	68	0	100
Roast lamb, size 2 chops.....	27	1.8	40	60	0	100
Bacon, one slice.....	15	.5	6	94	0	100

FISH (UNCOOKED).

	Grms.	Oz.	P.	F.	C. H.	Total.
Cod, 2 x 2 x 3/4 in.....	105	3.5	90	3	7	100
Blue fish, 2 x 2 x 1/2 in.....	68	2.3	71	29	0	100
Halibut, 3 x 1 1/2 x 3/4 in.....	83	3	70	30	0	100

EGGS.

	Grms.	Oz.	P.	F.	C. H.	Total.
Yolk, 1 1/2 yolks.....	27	.75	17	83	0	100
White, 7 eggs.....	181	6.25	100	0	0	100
Egg, whole, one.....	59	2.1	32	68	0	100

VEGETABLES.

	Grms.	Oz.	P.	F.	C. H.	Total.
Potato, one large.....	86	3	11	1	88	100
Corn, one ear.....	100	3.5	13	10	77	100
Peas, canned.....	178	6.3	24	4	72	100
Cabbage, uncooked.....	310	11	20	18	72	100
Celery, 1 bunch.....	540	19	24	5	71	100
Tomatoes, 4 medium.....	430	15	15	16	69	100
Succotash, 4 tablespoonfuls.....	100	3.5	15	9	76	100
Lima beans, 4 tablespoonfuls.....	126	4.4	21	4	75	100
String beans, 8 tablespoonfuls.....	480	16.5	15	48	37	100

DAIRY PRODUCTS.

	Grms.	Oz.	P.	F.	C. H.	Total.
Butter, 1 pat.....	13	.44	1	99	0	100
Cheese, American, 1 1/2 cu. in.....	22	.7	25	73	2	100
Milk, cows' average (3.50:4:4.50).....	140	5	20	52	28	100
Skim milk, (3.60:1.80:4.50).....	200	7	30	33	37	100
Butter milk, (3.60:0.50:4.06).....	278	9	41	13	46	100
Top milk, 7%, (3.50:7:4.50).....	102	3.75	15	66	19	100
Milk modified, (1.25:2.50:6.50).....	181	6.33	10	42	48	100
Cream, 16% (3.25:16:4.05).....	56	2	7	84	9	100

LIQUIDS

Consomme	830	29	84	0	16	100
Whey	285	10	11	25	64	100
Orange juice	188	7	0	0	100	100
Beef juice (warm process)	150	5.3	78	22	0	100
Cocoa	81	2.9	13	52	35	100

MISCELLANEOUS

Olive oil	11	.5	0	100	0	100
Olives, seven	32	1.1	1	84	15	100
Prunes, three	32	1.14	3	0	97	100
Dates, three	28	1.1	2	7	91	100
Fig, one medium	31	1.1	5	0	95	100
Almonds, eight	15	.5	13	77	10	100
Peanuts, 13 double	18	.6	20	63	17	100
Marmalade, 1 tablespoonful	28	1	1	2	97	100
Sugar, milk	25	.9	0	0	100	100
Sugar, granulated	24	.86	0	0	100	100
Macaroons two	23	.8	6	32	62	100
Lady fingers, 1½	27	.95	10	12	78	100
Strawberry shortcake, av portion	100	3.5	20	110	220	350
Chocolate eclair	60	2	12	100	188	250
Charlotte russe, one	60	2	10	80	160	250
Cranberry pie, small	252	8	32	228	440	700

LEPROSY. SOME NOTES ON SYMPTOMS.

BY JAMES A. HONEIJ, M.D., PENIKESSE, MASS.,

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THE study of leprosy has been so largely devoted to the bacteriology and pathology of the disease that the many clinical aspects presented have not been emphasized. The disease has many interesting manifestations that should be studied and recorded, until such time as definite conclusions may be reached.

From practically no early symptoms, or symptoms that are indefinite and vague, the gradual progress of the disease carries with it a variety of symptoms, subjective and objective, to the final stages of the disease which are indeed complex. After the disease is definite, in both the tubercular and anesthetic types of leprosy, almost every new lesion is accompanied with some systemic disturbance. The more frequent the lesion the greater the upset to the patient, and the severer the lesion the more distressing and serious are the accompanying symptoms.

Observations made here on fifteen patients hardly warrant authoritative statements at this time, but these notes are presented for whatever value or interest they may have.

Stages of the disease can hardly be spoken of, unless it means the merging of one type into another. The disease is in the beginning insidious, and later so progressive that any attempt to define stages must necessarily be purely fictitious. So-called physiological disturbances such as headache, constipation and minor ailments, may often be viewed as part of the disease, but are not, necessarily, unless they are regular in onset or similar in most of the cases. The isolation and depressing surroundings may be responsible for the many temperamental attacks, so common among the patients here.

Lack of exercise, mental torpor, national idiosyncrasies and other real, or imaginary, conditions may all affect the patient. Consequently it is necessary to be careful not to assume that certain symptoms or mental states are part of the disease.

Lesions. The theory has been advanced and somewhat substantiated, that the original lesion is on the nasal mucous membrane in the form of an ulcer. The examination of every patient, with the exception of one anesthetic type case, showed ulceration or thickening of the nasal mucous membrane, some but slightly, but the majority extensively affected. The symptoms present and complained of were, difficulty in breathing through the nose, some irritation and occasional pains, discomfort during the sleeping hours and the resulting dryness of the throat.

Ulcers with a pus or watery serous discharge are, of course, the common lot of all lepers, with the exception usually of the anesthetic cases. These ulcers vary in size, are painful only in the beginning, but later may be almost entirely anesthetic, with a surrounding ring of one-half inch or more, also anesthetic and sometimes pigmented. Often and usually before the appearance of an ulcer or ulceration on the feet or hands, there is a preceding swelling accompanied with severe pain, elevation of temperature even up to 104°, rapid pulse, headache, nausea, vomiting and true chills. As soon as the swelling has become strictly localized, and an ulcer results with free discharge, the symptoms disappear, leaving the patient for several days in a depressed, weakened condition. Areas of ulceration may be in a finger, a hand, or extend from the knee to the foot and include both feet. When healing in such cases takes place, the skin is enormously indurated and largely anesthetic. The symptoms are severer in these cases than in the case of the occurrence of a