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BOX 1 FOLDER 22

The Science of Nutrition

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AHGill

THE SCIENCE OF NUTRITION

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Nutrition is that life process by which organized bodies convert into substances like their own the nutritive matter in their food.

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"A man is what he eats."

"Courage, cheerfulness, and a desire to work depend mostly on good nutrition."—*Moleschott.*

A SUBSTANCE to be nutritive must be such as can be made soluble and such as can furnish to the body elements which it needs.

Unchanged starch is no more nutritious than charcoal, but by the action of the digestive juices or other agents, it is converted into soluble substances which readily pass through the membranes, are carried by the blood current to each little hungry cell and nourish it.

Only such portion of the food eaten as becomes soluble and passes through the walls of the digestive tract into the circulating fluids of the body is of use to it.

The quantity of food eaten is no criterion of the quantity of nutritive substances furnished to the body.

"Keep as near as ever you can to the first sources of supply —fruits and vegetables."— *B. W. Richardson.*

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ANIMALS and men have fed themselves and flourished for thousands of years; why do we of the twentieth century need to know more than the experience of these past ages have taught us?

The world existed without a knowledge of the power of electricity; is that a reason why we should not appropriate the increased benefits it brings?

Man has not yet reached the highest stage of development; that must come through the wisest balancing of his physical, mental, and spiritual powers. The body is the mind's instrument by which alone it can accomplish its highest aims. The world has not yet known a race whose bodies were developed for intellectual purposes. Instead of being a drag upon the spirit the body should be the swift messenger of accomplishment.

A knowledge of the laws which govern the most efficient production of human energy, it should be the ambition of all mothers to obtain.

"Myriads of our fellow creatures have perished because those around them did not know how to feed them." —*Fothergill.*

FOOD is not only the source of energy but must furnish material for building up the body and keeping it in repair. This is accomplished only through the nitrogen-containing or proteid compounds which are therefore indispensable in the daily food supply.

A man at moderate muscular work needs	125	grams or	4.4	oz.	proteid.
A woman at " " " "	112	"	3.9	"	"
A child of ten years needs	90	"	3.2	"	"

These proteid compounds may also serve as fuel, so that in estimating the nutritive value of any food the number of calories and amount of proteid matter must both be considered.

"There is no pain like the pain of a new idea."—*Bagehot.*

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THE human body is a machine, and like any other requires power (energy) to move it. It is however both boiler and engine. It produces the heat and the power, and it consumes power. Its forces can be reckoned in heat units like that of any other machine, and the food taken must be such as is capable of yielding these heat units or calories.

A man at moderate muscular work needs . .	3,500	calories.
A woman at moderate muscular work needs .	3,000	"
A child of ten years needs	2,500	"

Children of thirteen to eighteen need as much as men and women.

1	pound of	starch completely digested yields . .	1,845	cal.
1	"	butter fat	3,475	"
1	"	lean meat	545	"
1	"	sirloin steak as bought	1,040	"
1	"	round " "	870	"
1	"	potatoes "	325	"
1	"	apples "	255	"
1	"	corn meal	1,645	"
1	"	whole milk	325	"

"Wherefore do ye spend money for that which is not bread, and your labor for that which satisfieth not."—*Is. iv : 2.*

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THE daily requirement has been estimated both as regards energy and as regards proportion of ingredients and nutrients. The following table gives a comparison of the cost from both standpoints:

	Cost per pound.	Cost of 3,000 Calories or Heat units.	Cost of 1,500 nutritive units.
Corn Meal	3c.	5.4c.	7.7c.
Flour	5c.	9.1c.	11.8c.
Beans	5c.	9.3c.	9.2c.
Potatoes	1c.	9.6c.	13.8c.
Sugar	6c.	9.9c.	20.3c.
Bacon	12c.	11.5c.	15.3c.
Mutton or Pork, pretty fat	9c.	18.8c.	19.6c.
Butter	25c.	20.7c.	31.8c.
Cheese (full)	14c.	25.1c.	18.6c.
Beef (shin)	4c.	38.7c.	18.3c.
Eggs	15c.	68.7c.	54.5c.
Green Vegetables	5c.	96.7c.	89.4c.

" The fate of nations depends on how they are fed."

Average composition of some common food materials.

FOOD MATERIALS.	Water %	Proteid %	Fat %	Carbohydrate %	Fuel Value per lb.
Apples	61.5	.4	.4	12.4	255
Bacon	17.8	9.6	60.2	—	2,720
Beans	13.2	22.3	1.8	59.1	1,590
Beef (rump)	47.3	14.4	19.0	—	1,070
Bread (white) . . .	35.4	9.5	1.2	52.8	1,205
Butter	10.5	1.0	85.0	.5	3,615
Cheese (whole milk) .	33.7	26.0	34.2	2.3	1,965
Codfish (salt) . . .	40.3	16.0	.4	—	315
Fresh fish (cod) . .	58.5	10.6	.2	—	205
Eggs	66.0	13.1	9.5	—	645
Flour (white) Average of grades .	12.5	11.3	1.1	74.6	1,645
Milk (whole)	87.0	3.3	4.0	5.0	325
Oatmeal	7.2	15.6	7.3	68.0	1,860
Potatoes	67.1	1.8	.1	15.3	325
Rice	12.4	7.8	.4	79.0	1,630
Sugar	.2	—	—	97.8	1,820
Turnips	62.2	1.0	.1	6.1	135

"An hour of exercise to a pound of food."—*Felix Oswald.*

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The average human body weighs approximately 154 pounds, and is composed of:

Water	108 lbs.
Muscle and Tissue — Nitrogenous	30 "
Mineral matter	11 "
Fat	5 "

The daily waste from this body is about 9.65 pounds.

Water	6.50 lbs.
Carbon dioxide	2.25 "
Fæces, indigestible substances	.60 "
Urea — nitrogenous waste	.20 "
Mineral salts	.10 "

To supply this waste the body requires 9.65 pounds of nutritive material.

Water, 3 quarts	6.00 lbs.
Oxygen in 370 cubic feet of air	1.75 "
Carbohydrates, starch, sugar, etc.	1.00 "
Proteids in lean meat, gluten, etc.	.40 "
Fats in butter, oils of grains, etc.	.40 "
Mineral salts	.10 "

To obtain this nutritive material about 5.5 pounds may be purchased.

Meat, fish, eggs, and cheese	18.5 oz.
Milk	18.0 "
Butter	2.0 "
Cereals, peas, beans, etc.	12.0 "
Potatoes	12.0 "
Vegetables	12.0 "
Sugar	3.5 "
Fruits, fresh and dried	10.0 "

"The spirit of each dish and zest of all
Is what ingenious cooks the relish call."

"It is an irritating, nay a deeply saddening problem for a wise dyspeptic to ponder, the superabundance of things cookable in this little world of ours, and the extreme rarity of cooks."— *Maarten Maartens.*

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DEVELOP the full and characteristic flavor of each substance by the process of cooking, rather than add condiments in excess.

Cooking should so prepare the food material that the process of digestion should be helped, not hindered. The aim of many combinations found in the cook-books is to please the palate without regard to the further office of the food.

Variety during the month is better than variety at any one meal. Food in season has the best flavor. True economy lies in quality as well as in quantity, and in utilization of all material purchased.

KITCHEN PHILOSOPHY (from Manual for Army Cooks):

"In cooking, more than anything else in this world, always make haste slowly; one hour too much is vastly better than five minutes too little, with rare exception."

"The kitchen is the center of the household, and from it will radiate comfort or discomfort for every member of the family."