

SEPTEMBER, 1892.

GOOD



HEALTH

CONDUCTED
BY

J. H. KELLOGG M.D.

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SCIENCE in the KITCHEN

BY MRS. E. E. KELLOGG, A. M.,

Superintendent of the Sanitarium Experimental Kitchen and Cooking School,
and of the Bay View Assembly Cooking School, Superintendent of Mother's Meetings for the N. W. C. T. U., and Chairman of the World's Fair Committee on Food Supplies for Michigan.

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Consumption germs from a cavity in the lung.



Germs which produce the phenomena of red snow or blood rain growing on a potato.

SOME COMMON DANGEROUS GERMS GREATLY MAGNIFIED.



FIG. 1.



FIG. 2.



FIG. 3.



FIG. 4.



FIG. 5.



FIG. 6.



FIG. 7.



FIG. 8.



FIG. 9.



FIG. 10.

FIG. 1.

Germs which produce pus in boils, abscesses, and wounds.

FIG. 2.

Germs which cause pneumonia.

FIG. 3.

A germ which produces decay, magnified 16,000,000 times.

FIG. 4.

The germs which cause typhoid fever.

FIG. 5.

A living cell attacked by germs.

FIG. 6.

Germs of consumption.

FIG. 7.

The germ of leprosy.

FIG. 8.

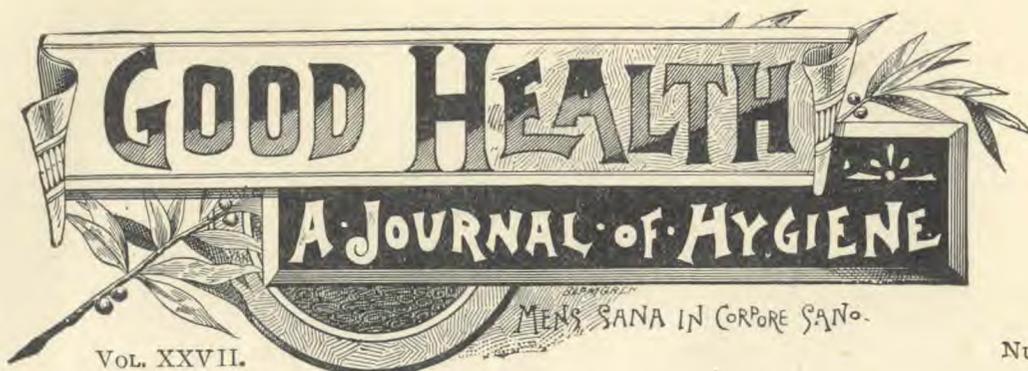
Cholera germs.

FIG. 9.

Germs which form red scum on ponds.

FIG. 10.

Vinegar producing germs.



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BATTLE CREEK, MICHIGAN.

SEPTEMBER, 1892.

INTERNATIONAL HEALTH STUDIES.

BY FELIX L. OSWALD, M. D.

Author of "Physical Education," "The Bible of Nature," Etc.

41. — Jamaica and Porto Rico.

IN bygone ages, when the archipelago of the Caribbean Sea formed a continuous island, or a promontory of the South American continent, the mountains of that (now half submerged) country seem to have culminated in the highlands of Jamaica. The Sierra de Cobre, or main chain of the Blue Mountains, rises at one point to a height of 8200 feet, or nearly two thousand feet more than the summit of our southern Alleghanies.

North and east of that pinnacle of the West Indian Island world, are wooded tablelands which seem destined to become a rendezvous of health seekers from the lowlands of the East American tropics and the adjoining swamp coasts of our own national territory. Even now, Florida newspapers advertise excursions by steamer from Key West to Port Royal, at the foot of the tropical Alps, which so long as two hundred years ago were noted for the longevity of their inhabitants. In 1670, when the island was formally ceded to Great Britain, many English colonists still followed the example of their countrymen in eastern North Carolina, who returned to Old England whenever their health began to suffer from the influence of an uncongenial climate; but experiments soon proved the fact that a bracing atmosphere could be found nearer home, and the uplands of the Blue Mountains before long were studded with summer villas.

Jamaica also enjoys a remarkable immunity from the hurricanes that have so often desolated other parts of the West Indies. The explanation can probably be found in the circumstance that nearly nine tenths of the island is covered with wooded hills.

There are no extensive plains, especially no treeless plains, which in the tropics are clearly a chief cause of violent atmospheric disturbances. The heat of such plains causes an upward movement of the atmospheric strata, and the air of the adjoining cooler regions rushes in to fill up the vacuum with a violence proportioned to the contrast of temperature. That contrast would naturally seem to be greatest near the coast regions of the tropics, where the heated atmosphere of extensive lowlands comes in contact with the cool breezes of the ocean, but at certain points of the equatorial zone that influence is augmented by air currents from the higher latitudes, and such regions consequently develop the most destructive storms.

In the West Indies, for instance, the temperature of superheated coast plains often rises as much as fifty degrees above that of the sea air, chilled by the influence of the northern tradewinds, and the result is illustrated in the yearly reports of devastating tornadoes, that have repeatedly desolated the lowlands of Cuba, San Domingo, and the east coast of Central America.

In Jamaica the shore rises abruptly from the beach to the foothills, so much so, indeed, that four hundred English miles of the coast-line are bordered by precipitous cliffs, where the waterfalls, even of good-sized rivers, plunge directly from the hills into the sea. The settlers of that coast range thus enjoy all the benefits of the tradewinds without being exposed to their perils, or to the mind-and-body depressing atmospheric influence which often precedes the outbreak of a hurricane. In birds and certain



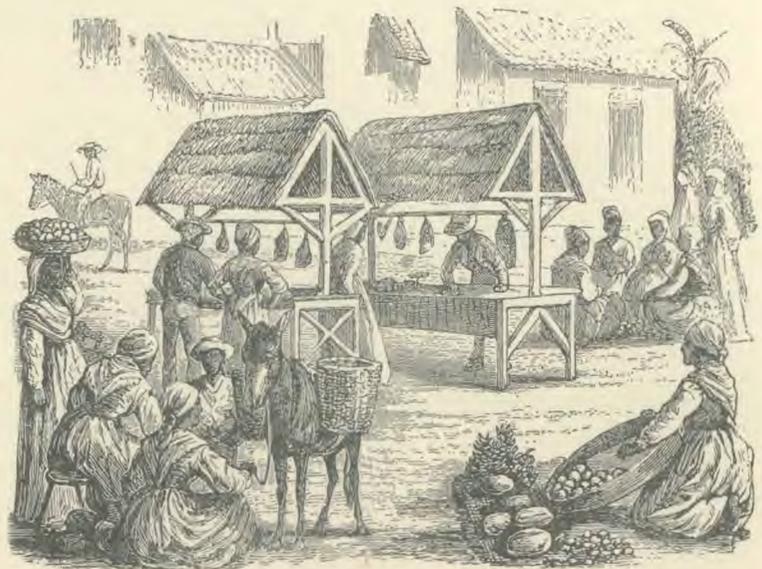
COUNTRY WOMAN AND "PICKANINNY."

animals, that influence appears to take the form of a vague uneasiness that warns them to seek safety in timely flight, and Prof. Jones, the naturalist of the Bermudas, speaks of negroes who appeared to share that instinct, and could predict the advent of a storm with more than the correctness of a barometer.

Thunder storms, too, are less violent in the cool forest hills of Jamaica than in other regions of the tropics, but the islanders get a little more than their fair share of earthquakes. Exactly two hundred years ago (September, 1692), the town of Port Royal was almost entirely destroyed — an event which the Spaniards did not fail to ascribe to the presence of numerous heretics in the commercial metropolis of the island; but eight years after, and again in 1714, the conservative stronghold of Real del Monte ("Spanish Town") experienced a similar fate, and the entire north coast attests the frequency of such convulsions. Rock masses of many thousand tons in weight have been hurled from the highlands into the sea, forming natural breakwaters at the entrance of several small harbors, and at numer-

ous points the very mountains seem to have been rent by the struggles of the subterranean Titans, — deep chasms extending far inland, and from the summit level of the Sierras to a depth below the surface of the sea, since the bottom of the abyss is covered with brackish water, evidently infiltrated through fissures communicating with the ocean.

On the whole, however, the "Land of Wood and Water," as the Jesuit Mariano translates the old Carib name of *Xaimaca*, is the healthiest of the West Indian Islands, and the remarkable decrease in the white population, as well as in the value of the annual exports, is due entirely to social causes. The news from the gold fields of California drew hundreds of young men to the far West, and the prosperity of the Australian colonies, too, helped to drain the West Indies, but the fact remains that the British Abolitionists had rather overdone things in their zeal for reconstruction. Not content with liberating 250,000 slaves by an ukase of Parliament, they offered a premium on idleness by forcing the white planters to support swarms of shiftless darkies, till the "poor rates," or "loafer rates," as Carlyle called them, more than devoured the scant profits of agriculture. Encouraged by the repeated interference of their British champions, a large plurality of the blacks at last refused to work at all, and wandered about the island, fishing and "gypsying," *i. e.*, passing their days in shady camps, and their nights in pilfering expeditions. From the verdicts of local courts their leaders appealed to Great Britain, and armed revolts became more and more frequent, till Edward Eyre was appointed governor of the island, and succeeded in remedying the evil by the simple plan of



MARKET SQUARE.

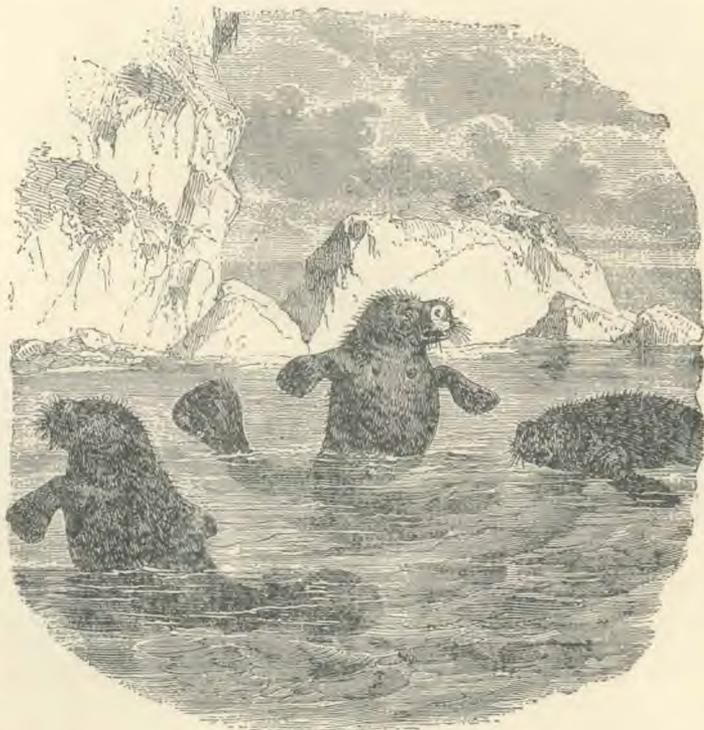
refusing to interfere with the natural results of shiftlessness. Shiploads of laborers were imported from Mexico and the Bahamas, the poor rates were applied to the benefit of orphans and cripples, and able-bodied loafers were confronted with the stern alternative of work or starvation. The "tramp insurrection" of 1865 was suppressed with an energy that made the rebels take to the woods, and from that year the almost ruined industries of the island have gradually but steadily revived.

The English philanthropist, too, got tired of risking his popularity by "constant interference in behalf of lazy gluttons," as Sir Roderick Murchison expressed it, on the trial of Governor Eyre, who had been summoned to England to answer for his summary methods in dealing with the tramps. Frederick the Great on one occasion tried to conciliate the favor of the masses by meddling, rather despotically, with the business of the courts, but realized the significance of his mistake a month after, when his castle at Sans Souci was literally besieged by petitioners who wanted him to override the law by a similar reversion of sentence in their favor.

The British champions of *Trampus Africanus* had begun to experience similar inconveniences of their policy, and the Jamaica colonists finally were allowed to manage their own affairs. Moreover, experience has since proved that even in the tropics, habits of steady industry are more conducive to longevity and health than habitual idleness. On the heights of the Blue Mountains many darkies have established poultry farms (enjoying immunity from the sand-flea plague of the lowlands); near the cities there are colonies of negro washerwomen, whose husbands contribute to the support of their families by hauling water or peddling fruit; all these industrial blacks are healthier and live longer than do the "gypsies," who eke out an existence by begging and reliance on the spontaneous bounty of Nature. Since the whites have entered into a solemn league against the support of these idlers, the tramps are obliged to live upon the charity of their industrious kinsmen, with results illustrated by the frequency of lynch justice administered by the negroes themselves. A posse of forty or fifty city darkies will assemble at some out-of-town rendezvous, and make a sudden raid on a gypsy camp to recover carloads of stolen plunder, and treat the loafers to a dose of vendetta, which generally

makes them more careful for a month to come. Some are compelled to carry heavy sandbags to the top of the foothills, others are forced to swallow quarts of sea-water to purge the devil of laziness out of their systems, and, often enough, their children are removed to a farm, to prevent them from graduating in a school of larceny.

But even without such Kuklux raids the gypsies are apt to die out from the natural effects of their way of living. Skin diseases, malaria, and typhoid fever remove hundreds, and their progeny, as a rule, is



THE MANATEE.

much less numerous than that of the farm workers and mechanics, though withal more precocious. The young of the inferior animals, such as pigs and rabbits, develop very rapidly, while puppies are helpless for months, and for analogous reasons a city youngster of four years is a lump of awkwardness compared with the young Hottentot of the same age.

Porto Rico seems originally to have formed a part of San Domingo, since the mountains of both islands range in the same direction and exhibit the same geological characteristics. The climate, too, is very similar, but the Spaniards at first almost ignored the existence of the fertile *guayo* which Columbus had visited in 1493. Mexico and Cuba seemed to offer a richer field for enterprise, and the natives of Porto

Rico were left in peace for nearly fifteen years, but in 1509, the fate of the island was sealed by the discovery of gold on the banks of the Rio Hovas. Adventurers by hundreds, and soon by thousands, invaded the new El Dorado, and in less than twenty years the entire aboriginal population of 700,000 harmless Indios had been exterminated—worked to death in the most literal and barbarous sense of the word.

If it is remembered that the horrors of the French Revolution devoured only half a million victims in a country of 195,000 square miles, the inhumanity of the Spanish colonists can be better realized, and it would, indeed, seem as if the murderers had at last stood aghast at the result of their own work, since the slaves of the island were ever afterwards treated with exceptional clemency. In 1568, laws were enacted to regulate the relations of master and serf; insurrections have been successfully avoided, and a traditional jealousy of their Cuban neighbors has prompted the people of Porto Rico to avoid many of the worst political mistakes of the larger island. As a consequence, Porto Rico has preserved to an unusual degree the type of the better Spanish colonies of the Columbian era, and as a rule, the population is more attached to the crown of Castile than are the inhabitants of Old Spain itself.

Like the Creoles of Brazil, the whites marry early, marriages of boys of fourteen and girls of twelve years being considered no violation of any existing or respected law. Indolence, too, is a besetting sin of the ruling classes, but the fertility of the island modifies the penalty of sloth. Three crops of maize and two of yam-roots can be raised with a minimum of labor, and the woods of the uplands swarm with gallinaceous birds, some of them laying a large number of eggs, that form a welcome addition to the frugal fare of the poor. Bananas are the staff of life; in the production of cane sugar Porto Rico ranks next to Cuba; orange plantations employ thousands of laborers, and young children can make living wages in defending the fields against the myriads of blackbirds and rats. Noxious insects, too, attack

the crops—all but the plantations of castor-oil plants (*Palma Christi*), which would rival a grove of upas-trees in protecting themselves against the attacks of all living things, man excepted. No insect touches the seeds, though garnered for months in a warm climate; starved cattle refuse the leaves of the noisome plant, and that evidence of instinct ought to refute the belief in the remedial virtues of *Ricinus* oil. The natives have no use for the seeds, but raise considerable quantities for export.

Malaria is rare in the vicinity of the larger sea-ports, but remittent fevers are often contracted in the lagoons of the north coast, where numerous sportsmen resort every year for the purpose of manatee hunting. These lagoons are lined with mangrove swamps which seem really not only to indicate, but to produce malaria, by drawing decomposed matter from the ooze of the fens. They also swarm with tipulary insects, and their repulsive appearance may be accepted as a hint of nature to avoid such localities, the more so as it is next to impossible to reclaim a well-rooted mangrove jungle.

Native naturalists attest the curious fact that the island does not harbor a single species of venomous serpents. Boas, too, are unknown, and the chief zoological bugbears of the natives are the rather numerous scorpions and centipedes, whose powers for mischief have been as absurdly exaggerated as those of the tarantula, which sometimes lurks in the banana cargoes imported from the West Indian Islands. Only a generation ago medical men believed in the efficacy of a certain tune as the only possible remedy for the contortions produced by the bite of the sand spider, and coined the word "tarantism" to express the mysterious affection. It has since been demonstrated that the name, both of the spider and of the melody ("La Tarantella"), were derived from the town of Taranto, in Southern Italy. After long years of travel in the tropics, the naturalist Burmeister declares from personal experience that he would prefer the bites of a dozen tarantulas to the sting of a single hornet.

(To be continued.)

SAVED FROM DEATH BY BELONGING TO A BAND OF HOPE.—An English paper details a shocking event which took place recently at Castle Cary, Somerset. Three little boys played truant from school, and strolling about, came to a sheepfold, and seeing a bottle, mistook it for a cider bottle belonging to the shepherd. Two of them drank from it, but the third

declined, "because he was a member of the Band of Hope." The vessel contained a lotion used for "sheep rot," a fatal poison. The other two lads soon dropped to the ground in convulsions. One expired before he could be taken to the surgery of a neighboring doctor, and the other expired soon after admission.

THE TRUTH ABOUT ALCOHOL.

THE great stronghold of intemperance is to be found in the false doctrines held and taught by the majority of the medical profession respecting the character and use of alcohol. At the second meeting of the American Medical Temperance Association, held at Detroit last June, Prof. N. S. Davis, M. D., LL. D., of Chicago, President of the Association, delivered a remarkable address, in which he thoroughly exposed the fallacies upon which both the common use and the medicinal use of this baneful drug are based. We give the address below :—

“Gentlemen : We are assembled to note the first anniversary of this Association, which was organized in Washington, D. C., May, 1891. The objects had in view by those who participated in its organization as declared on that occasion were ‘to advance the practice of Total Abstinence in and through the medical profession, and to promote investigation as to the action of alcohol in health and disease, and to form a bond of union among medical abstainers all over our country.’ That those three objects are of sufficient importance to challenge the attention of every well informed and unbiased member of the profession, must be admitted by all. Especially is this true if we consider the fact that more than \$800,000,000 are annually paid for alcoholic drinks, fermented and distilled, by the people of this country, over \$700,000,000 by the people of Great Britain, and nearly in the same ratio by all the nations occupying the continent of Europe ; and all this without returning so much as a single cent to the consumers who pay the money, or a pound of bread for their families. If we also consider the fact that all our highest judicial authorities and social economists attribute much more than half of all the pauperism and crime in the same countries, to the use of those drinks, while the highest authorities in our own profession freely admit that a large percentage of the sickness and mortality is traceable to the same source, we will be compelled to admit that there is no other topic more imperiously demanding a candid, persistent, and thorough investigation by every practitioner of the healing art, than that which relates to the real influence of alcohol directly upon the living human system, and indirectly upon the collateral interests of the race.

“To make such investigations accurate and reliable, the investigator must himself be free from the deceptive and perverting influence of alcohol upon

his own brain and blood. In the language of our excellent Code of Ethics : ‘It is incumbent upon the faculty to be temperate in all things ; for the practice of physic requires the unremitting exercise of a clear and vigorous understanding ; and in emergencies, for which no professional man should be unprepared, a steady hand, an acute eye, and an unclouded head may be essential to the well-being, and even life of a fellow-creature.’ Hence, our by-laws require the practice of total abstinence from alcoholic drinks by the members of this Association, although they place no restrictions upon the conscientious use of alcohol in the treatment of disease. To determine more accurately the origin, nature, physiological effects, and therapeutic uses of alcohol, and to diffuse a knowledge of the same, both in and out of the profession, is the paramount object of our organization. As an Association we have nothing to do with the political parties and questions of the day, whether of prohibition, high license, low license, protection, free trade, or reciprocity. Our work is one of strict scientific inquiry and investigation.

“Prof. Schmoller, the economist of Germany, says : ‘Among our working people the conditions of domestic life, of education, of prosperity, of progress, or of degradation are all dependent upon the proportion of income which flows down the father’s throat. The whole condition of our lower and middle classes, one may even without exaggeration say the future of the nation, depends on this question.’ As the same may be said with equal truth concerning our own people, it certainly becomes us, as the professional guardians of the public health, to ascertain more certainly the nature and effects of those drinks that ‘flow down the father’s throat,’ and which carry with them the income on which depends the domestic happiness, the education, the prosperity, and much of the health of the whole community. It is hardly necessary to say that the one essential ingredient in all the ‘drinks’ here spoken of, whether fermented or distilled, is alcohol. It is not found as a proximate element in living organized bodies, either vegetable or animal, but is exclusively the product of bacteriological action on glucose or saccharine matter, constituting the process known as vinous fermentation. In other words, alcohol is an effete toxic product resulting from the action of the microorganisms known as the *torula cerevisia*, of Turpin, on sugar or glucose, and is composed of C₂ H₆ O.

It is therefore chemically a pure carbo-hydrate, and early in the progress of analytic and organic chemistry, it was unfortunately classed by Baron Liebig with those carbo-hydrates resulting from vegetable growth or nutrition,—starch, sugar, gum, and cellulose,—as supporters of combustion or respiratory food when taken into the human system. Such classification was not founded on the results of scientific investigations showing that the actual effects of alcohol, starch, sugar, etc., when taken into the living system, were similar, but solely on the fact that they were all composed of the same ultimate elements, carbon, hydrogen, and oxygen, in such proportion as to admit of further oxidation outside of the living body.

“And as such oxidation or combustion was accompanied by the evolution of heat, it was assumed without experiment or proof that all these carbo-hydrates were oxidated in the living system, and were active supporters of respiration and animal heat, while the various organized animal tissues were developed and nourished from the nitrogenous proximate elements of food. The simplicity of such a classification of foods and animal tissues, aided by the high authority of Liebig, caused it to be universally accepted and thoroughly incorporated into both medical and general literature, where, in the public mind at least, it still remains, and is a fair illustration of the danger or fallacy of assuming that similarity of chemical composition is proof of similarity of action when taken either as drink, food, or medicine.

“From a somewhat extended investigation of the subject, I think it may be stated as a general law, that all the orders of animal life are dependent for their development, growth, and nutrition, upon materials resulting from either vegetable or animal growth. Certainly none of the higher orders of animal life assimilate and appropriate for the growth or repair of their structures and the support of their physiological processes, inorganic materials not previously combined under the formative or vitalizing influence of vegetable or animal life. It may be further stated as an equally general law, that the products of retrograde metabolism or tissue metamorphosis as represented in the excretions and eliminations from living bodies, both vegetable and animal, are not only incapable of being used as food, but are either inert or positively toxic if retained or reintroduced into the living body.

“Hence, we have a clear and most important distinction between such carbo-hydrates as starch, sugar, gum, cellulose, and dextrine, resulting from vegetable and animal nutrition, and the alcohols,

which result solely from retrograde metamorphosis or bacteriological excretion, usually termed fermentation. And instead of acting alike as respiratory or indirect food, as has been claimed so long, all the strictly scientific investigations of the last half century have proved their action upon the structures and functions of the living body to be as diverse as their origin. Thus the carbo-hydrates of the first class named,—starch, sugar, gum, etc.,—when taken into the healthy stomach, readily undergo such digestive and assimilative, or molecular changes that their identity is not recognizable in either the blood or the tissues of the healthy animal, and products derived from them produce no unnatural excitement or disturbance in any of the functions and processes of the living body. Though taken in proper quantities daily from year to year, they create no craving or morbid appetite for more; and when the quantity taken at one time is excessive, such excess is rejected with the ordinary faecal matter of the intestines.

“But the alcohols constituting the second class undergo no such digestive or assimilative changes in the stomach or digestive apparatus. If the ordinary ethylic alcohol is taken into the living stomach undiluted and absolutely pure, it acts directly upon the tissues with which it comes in contact as a destructively corrosive poison, and speedily destroys the life of both vegetables and animals when brought in contact with them. When largely diluted with water, as it is in the various fermented and distilled liquors, and taken into the stomach, it is rapidly imbibed, without change, and carried directly into the blood, and with it, into every tissue and organ of the body, as has been demonstrated by the application of reliable tests many hundred times. More or less of it also soon reappears in the excretory secretions and eliminations of the lungs, skin, and kidneys, like other foreign or non-assimilable materials. While retained in the blood and in contact with the tissues, the alcohol modifies in a marked degree the sensibility of the nervous structures, and also the molecular or metabolic changes concerned in nutrition, disintegration, and sensation. If taken daily for a considerable length of time, it invariably creates a morbid appetite or craving for steadily increasing quantities, and sooner or later establishes degenerative changes in nearly all the organized structures of the body. It is obvious, therefore, that there is actually no similarity or analogy, either histological or physiological, between the carbo-hydrates of vegetable and animal growth and those derived from bacteriological or putrefactive fermen-

tation. And the time has fully come when the purely theoretical and most mischievous error of grouping them together as respiratory and force-generating food, should be corrected in all our literature and eradicated from the public mind. Half or three quarters of a century since, when alcohol was placed at the head of the list of respiratory foods by the chemico-physiologists of that day, it was claimed that when taken into the living body, it readily combined with oxygen, and was resolved into carbon-dioxide and water, with the evolution of heat; and hence it came into almost universal use as a supposed stimulant and promotor of animal heat. Step by step, however, investigations carefully devised and faithfully executed, have not only demonstrated this supposition to be erroneous, but they have equally demonstrated the real action of alcohol in the living human system to be that of an active anæsthetic, directly diminishing cerebral and nerve sensibility and muscular action; a retarder of the internal respiration, by which oxygen is carried from the pulmonary to the systemic capillaries; and a sedative or retarder of the molecular or metabolic changes in the tissues and secreting structures of the body.

“These several propositions have been so fully sustained by the direct experimental investigations of Prout, Böcker, myself, Richardson, Anstie, Hammond, Harley, Sidney Ringer, Martin, H. C. Wood, Lauder Brunton, Dubois, Reichert, and many others, that it would be superfluous to quote them in detail. There are, however, still many, both in and out of the profession, who claim that alcohol is an anæsthetic only when given in large doses; while if given in smaller doses and repeated at suitable intervals, they claim it acts as a stimulant and tonic, especially on the cardiac nerves. The incorrectness of this claim is completely demonstrated by the investigations of Drs. Ringer and Sainsbury and Professors Martin and H. C. Wood.

“The experiments of Sidney Ringer and Harrington Sainsbury were instituted for the purpose of determining the relative strength of different alcohols, as indicated by their influence on the action of the heart of the frog. In closing their report on the subject, they say: ‘By their direct action on the cardiac tissues these drugs (alcohols) are clearly *paralyzant*, and this appears to be the case from the outset, no stage of increased force of contraction preceding.’

“The experiments of Professor Martin, of Johns Hopkins University, were performed on the dog, and he states the results obtained as follows: ‘Blood

containing $\frac{1}{8}$ per cent by volume of absolute alcohol has no immediate action on the isolated heart. Blood containing $\frac{1}{4}$ per cent by volume, that is $2\frac{1}{2}$ parts per 1000 of absolute alcohol, almost invariably remarkably diminishes, within a minute, the work done by the heart; blood containing $\frac{1}{2}$ per cent always diminishes it, and may even bring the amount pumped out by the left ventricle to so small a quantity that it is not sufficient to supply the coronary arteries.’

“Prof. H. C. Wood, of the University of Pennsylvania, also executed his experiments on the dog, and in his address to the International Medical Congress at Berlin, 1890, states his results as follows: ‘An 80 per cent fluid (alcohol) was used, diluted with water. The amount injected into the jugular vein varied in the different experiments from 5 to 20 cubic centimeters, and in no case have I been able to detect any increase in the size of the pulse, or in the arterial pressure, produced by alcohol, when the heart was failing during advanced chloroform anæsthesia. On the other hand, on several occasions the larger amounts of alcohol apparently greatly increased the rapidity of the fall of the arterial pressure, and aided materially in extinguishing the pulse rate.’ That alcohol exerted not only a general anæsthetic effect upon the nervous system, but also a special or direct paralyzing influence on the cardiac and vaso-motor nerves, strictly parallel with that produced by chloroform and ether, was clearly shown by R. Dubois, in 1883. And the editor of the department of experimental therapeutics in the fifth volume of the ‘Annual of Universal Medical Sciences,’ 1892, in referring to the review of the work done by nearly all those who have engaged in experimental investigations regarding the effects of alcohol on the living system, by E. MacDowell Cosgrove, truly says: ‘Contrary to what has been and is supposed, it is found from all these researches that small doses of alcohol, from the first, produce a narcotic rather than a stimulating effect.’ And he adds that all the observers except one, had ‘also found that alcohol in small doses diminished the amount of carbon-dioxide exhaled.’ It is thus shown, by direct experimental researches of the most eminent men in different countries, aided by all the instruments of precision invented in this period of active scientific progress, that alcohol in the living system actually diminishes the sensibility and action of nerve structures in direct proportion to the quantity used. An ordinary regard for scientific accuracy, therefore, demands that it should be classed as an anæsthetic or narcotic, and in no sense as a stimulant or tonic. In studying

further the mode by which alcohol produces its effects while in the living human system, it is necessary to appreciate the full import of the following propositions:—

“1. All nerve sensibility and force, and all natural molecular or metabolic changes, nutritive, secretory, and disintegrating, taking place in the living tissues, are absolutely dependent on the presence and movement of blood containing its natural proportion of oxygen.

“2. The oxygen needed in the blood is received from the pulmonary air cells by the hæmoglobin and serum of the blood and in them conveyed to the systemic capillaries, where it comes in contact with, and exerts its influence on, every cell and structure of the body.

“3. Alcohol at ordinary temperatures of the air, or even of that of the living human body, manifests but a very feeble affinity for oxygen, but does manifest a very strong affinity for water, albumen, and hæmoglobin, acting upon them readily at all ordinary temperatures.

“If, therefore, alcohol sufficiently diluted to permit its circulation in the blood, should be introduced, either by the stomach or any other method, instead of uniting with the oxygen, it would present its superior affinity for the hæmoglobin and serum albumin, and thereby directly interfere with their reception of more oxygen from the pulmonary air cells. It is thus that the presence of the alcohol hinders the hæmoglobin from being converted into oxy-hæmoglobin in the pulmonary capillaries, and in the same ratio diminishes the amount of oxygen conveyed to the systemic capillaries; and in the same ratio, also, the nerve sensibility and metabolic changes diminish. This affords a full explanation of the facts now admitted by all who have carefully studied the subject, namely, that the presence of the alcohol retards both nutritive and disintegrative changes, diminishes excretory products and temperature, and lessens nerve sensibility and force.

“An explanation of these admitted facts has been hitherto, and still is, sought for on the supposition that alcohol simply unites with the oxygen of the blood, and thereby prevents or diminishes the action of the latter on the tissue elements of the body, and yet generates heat and some kind of force. The fatal defect in this old combustion or oxidation theory is that no investigator has been able to find the legitimate products of such oxidation. So far as is known, the oxidation of alcohol resolves it into either aldehyde and carbon-dioxide, or acetic acid and water, with evolution of heat. Consequently, if alco-

hol underwent oxidation in the system, some increase of one or all of these products should have been uniformly found, in the blood, the exhaled air, or in the other excretions. But instead, the most accurate and numerous investigations show less carbon-dioxide in the exhaled air, less temperature of the body, and neither acetic acid nor aldehyde in the blood.

“And yet the puzzled investigators turn and say that, inasmuch as the alcohol disappears in the system and cannot be all regained from the secretions and eliminations in a limited time, it *must* have been oxidized and converted into some kind of force. But what force? Certainly not nerve force, mental force, muscular force, heat force, or metabolic force; for all of these are directly diminished by its presence. The only force found operative in the case, is the superior affinity of the alcohol for the hæmoglobin, albumin, and water of the blood, and its toxic power to so modify their molecular condition and properties as to diminish their efficiency in receiving and conveying the oxygen from the pulmonary to the systemic capillaries, and thereby impairing all the vital processes in which the presence of oxygen is required.

“This view also affords a rational explanation of the numerous pathological changes everywhere recognized as resulting from the habitual use of alcoholic drinks, even in the most moderate quantities. These changes were well exposed in the celebrated discussion on chronic alcoholism by the Pathological Society of London, only two years since, and are easily found on the pages of our medical literature.

“It enables us also to see clearly the philosophy or rationale of those illusions and delusions that have been imposed upon the human mind by the use of alcohol in both health and disease through all the generations of the past. Thus, a moderate dose in health, by its anæsthetic effect on the nerve cells of the brain, lessens the individual's consciousness of cold or heat, of weariness or despondency or weakness, and he is deluded with the idea that it had warmed and cheered and strengthened him, when it had done neither; but instead, had simply diminished the acuteness of his own perceptions, while the evils continued in full force. So in the progress of disease, its use generally has the same anæsthetic effect, causing the patient to complain less, rest more, and often say he feels better; but it neither removes the exciting cause, nor corrects the morbid processes constituting the disease, nor increases the activity of the metabolic changes of either nutrition or elimination. Nor is this all; for in the same

proportion as alcohol diminishes the internal distribution of oxygen and thereby acts as a so-called conservator of tissue, it still more actively interferes with the katabolic processes by which the natural excretions are maintained and foreign disturbing elements are eliminated; and consequently it prolongs the morbid processes, favors molecular degenerations, and increases the ratio of mortality. Clinical facts and cases could be cited in abundance, illustrating and sustaining the correctness of the foregoing views, did my time permit. I will, however, at present only add for your consideration the following questions: 1. If the physiological standard of health requires a natural degree of sensibility of the cerebral hemispheres and the internal distribution of oxygen in natural quantity, and the presence

of alcohol diminishes both in direct ratio to the quantity taken, how is it possible for persons in health to use it without injury?

"2. If alcohol, while in the living system, does thus diminish the sensibility of the nerve structures and retard the internal distribution of oxygen, is it not a true anæsthetic and organic sedative, and, therefore, adapted to the treatment of only a very limited number of morbid conditions presented in the progress of disease?"

"3. Is it not true that all the fermented and distilled alcoholic liquors are genuine toxic products of bacteriological cultures? and ought we not to uniformly designate them as such, instead of continuing to delude ourselves, our patients, and the public, by calling them tonics, stimulants, or indirect food?"

GERMS IN RELATION TO EVERY-DAY LIFE.

(See Frontispiece.)

THE discovery of germs and their relations to the ordinary conditions of health, is one of the most important advances made in modern times in sanitary science. Moses evidently understood the mischief-working power of these microscopic organisms, though he was unacquainted with the real nature of the cause of the various forms of an infectious disease due to these minute vegetable forms, such as leprosy and various maladies arising from insanitary conditions. It was this which led to the quarantine regulations of Bible times, respecting persons suffering from leprosy, now well known to be a germ disease, and the vigorous sanitary measures required in case of the appearance of so-called leprosy in a human habitation. We are far less scrupulous nowadays in the care of our premises than were the Israelites while living under the law of Moses. Thousands of modern houses are leprously infected with must and molds of various species, while the inhabitants are, through their ignorance, wholly oblivious to the dangers to life and health amidst which they live.

The purpose of this article and of the frontispiece which appears with the present number, is to impress upon our readers the importance of recognizing, and as far as possible avoiding the unseen foes of human life which surround every human being living in a civilized community.

First of all, we must mention dust as the most dangerous of all sources of germs. The dust of the street is a miscellaneous assemblage of almost every

species of unclean and hurtful germs. The decomposing matters in the gutters and moist places by the wayside, the excreta of animals, dead bodies of insects and small animals left upon the highway to undergo decomposition and disintegration, are ground into an impalpable powder by the wheels of passing vehicles and the feet of horses and pedestrians, and are then lifted into the air by every passing wind or breeze, so that the atmosphere ultimately becomes densely charged with these minute organisms. Moist germs are incapable of floating in the air, and hence are comparatively harmless, unless they find their way into our food and drink; but when dried and separated into small masses, these microscopic growths, which are smaller than the finest dust visible to the naked eye, easily float in the air, and are carried into the lungs with every respiration.

Street dust finds its way into our houses through open doors and windows, and upon the feet of inmates and visitors, so that carpets, rugs, and mats become saturated with it; and in houses in which the old style of carpets lined with a thick matting of straw are still to be found, each carpet hides in the loose meshes of the straw beneath it countless millions of the most deadly foes of human life, which are ready to issue from their hiding-place and begin their work of mischief whenever disturbed by the pressure of a shoe, the stroke of the broom, or the movement of an article of furniture. When the housemaid begins her usual morning round of sweep-

ing, dusting, and "putting things to rights," the house air becomes thoroughly alive with these potent destroyers of life and health. They may not be ordinarily visible, but that they are there, may be readily demonstrated by the experiment of closing a room under the conditions named, and allowing a single ray of sunshine to penetrate the darkness through a minute opening in a dark curtain, or a closely fitting shutter. The poetic "motes which dance in the sunbeams," are nothing more nor less than germs — at least in large part.

A household in which dust abounds cannot be a healthful place. In such a home, catarrhs, influenzas, sore eyes, earaches, and other maladies still more serious, such as diphtheria, pneumonia, etc., are frequent visitors. The relation between drain-pipes and diphtheria, and other germ disorders, has been so long and so thoroughly established, that it is scarcely necessary to mention this source of household infection. The similar connection between impure water and typhoid fever has been too often and too vividly enforced by such examples as that of the little town of Plymouth, Pa., in which a large proportion of the inhabitants suffered, scores fatally, from this malady, as the result of contamination of the city water-supply by a single case of typhoid fever, in a mountain district where originated one of the little streams employed by the water company to fill its reservoirs.

The frequent contamination of milk with tyrotoxin and other germs, is unquestionably one of the most common causes of cholera infantum, cholera morbus, and the numerous forms of so-called bowel complaints which prevail in the warm season of the year. Milk is unquestionably one of the most common sources of noxious germs. It was formerly supposed that these germs were somehow derived from impure water swallowed by the cow and excreted by the milk glands. It has been shown, however, that this very rarely, if ever, occurs. The real source of contamination is the careless manner in which milkmen care for the cows and empty their udders. The cow's body becomes covered with excreta and various forms of filth, and being rarely washed or groomed, the hair becomes filled with dust-laden germs, which drop into the milk, together with the minute particles of excreta, and thus the milk becomes infected after it leaves the animal. Warm milk encourages the rapid development of germs, so that, in the course of a few hours, each drop is swarming with millions of these micro-organisms, most of which are, fortunately, comparatively harmless, though now and then germs of

a very deadly character appear, and serious results are then likely to follow.

Observations made a few years ago, at the Experiment Station of the Connecticut Agricultural College, show that when obtained under ordinary conditions, milk contains from twenty-five to thirty different kinds of germs, each with its characteristic odor, suggesting its origin in barnyard, pig-sty, chicken-coop, and other germ strongholds which exist in close proximity to the ordinary dairy.

It is indeed a most astonishing thing that an article of food so freely and commonly used, should be produced under conditions so obnoxious, not only to health, but to the natural instincts of cleanliness and wholesomeness which every civilized human being is supposed to possess. No other article of food eaten by human beings is really so greatly and almost uniformly contaminated with filth as milk. The father who would exercise the greatest care as regards neatness and cleanliness of habits and appearance in the selection of a wet-nurse for his motherless infant, will not hesitate to supply his family with milk from cows which are kept in prison stables teeming with the vilest filth, their bodies smeared with ordure, not infrequently covered with vermin, and their lungs inhaling air saturated with germs and the poisonous products of putrefaction and decay. How can it be imagined that food from such a source can be otherwise than poisonous?

In order to furnish milk of the proper quality to nourish a human being, a cow should be kept under conditions as wholesome and cleanly as those under which human beings should be kept. The animal should be well groomed and washed daily, if kept in a stable (which should be only during cold weather), and abundant supplies of fresh air should be provided. The same care should be taken respecting her food and diet; it should be as wholesome and free from germs and putrefactive processes as though it were intended to be taken directly by human beings. Germs at second hand are nowise improved, as a rule, but are likely to be multiplied and intensified in their activity.

Cheese, one of the products of milk, exhibits the germ-life present in this common article of food, in the highest degree of activity. The process of cheese-making includes no means by which germs are killed, or their development prevented, and consequently we have in cheese not only the original milk, but the countless myriads of germs which have been developed since its infection after leaving the cow, and the various poisonous products which are the result of the growth of these micro-organisms.

We think it not too much to say that an article in every grain of which are to be found swarming millions of germs, is in nowise fit to enter the human stomach.

Much more might be said respecting the relation of germs to the common conditions of life as regards health, but space forbids for this time, and we con-

clude by simply calling attention to the colored frontispiece which appears in the present number, on which are represented some of the most common germs, which are shown as they appear under a powerful microscope. A number of explanations accompany the plate.

EXCESSIVE CAUTION.—“I hope, Jennie, that you have given the matter serious consideration,” said a lady to a servant girl who had “given notice” because she was to be married “that day two weeks.”

“Oh, I have, ma’am,” was the earnest reply. “I’ve been to two fortune-tellers and a clairvoyant, and looked in a sign-book, and dreamed on a lock of his hair, and been to one of these astrologers, and to a meejum, and they all say to go ahead, ma’am. I ain’t one to marry reckless like, ma’am.”—*Harper’s Bazaar*.

TIRED PEOPLE.—Of the many unfortunate people in the world, there are few so deserving of pity as those whose daily toil is such a hardship to them that neither strength nor inclination is left for anything else. The drain upon their energies is so heavy that nature is unable to meet it; and now and then there is a breakdown, which means loss of work and of money, and a doctor’s bill into the bargain. To such sufferers we would suggest the advisability of looking at matters fairly and thoroughly, and asking themselves whether it is not possible to lighten in some measure the burden of work and responsibility that is now crushing the zest and joy out of life. Some of us have got into the uncomfortable habit of doing things we have no business to do. In our anxiety to have the work well done, we go fidgeting round, giving finishing touches that are not needed, and allowing it to absorb more time and strength than we can spare. That happy knack that some persons have of working quietly, easily, and with as much contentment as can be gained out of the day’s experience, is worth cultivating, if only for the sake of the physical exhaustion it will save. A bustling, worrying, excitable workman goes through far more exertion, yet does his duty no better than his more orderly neighbor. The old saying that “it’s no use killing yourself to keep yourself,” has a grain of wisdom in it for tired people. The most effectual remedy for the weariness that proves so embarrassing in the majority of instances is to lessen the present strain somehow, and be careful not to add new, unnecessary burdens. When nature calls for a rest, her demand must be obeyed, and it must

be a genuine respite from toil. There is not much permanent advantage to be derived from trying to push a number of little jobs in edgewise, “while we are resting,” and a persistent adherence to such a practice will result, sooner or later, in a weariness of body and a depression of spirit that will tax to their utmost the best efforts of doctors and nurses.—*Health and Home (Eng.)*.

YOUR HOME.—You are contemplating the erection of a house in which you intend to live with your family as a future home, and so far as your means will permit, you are naturally desirous of making this house a perfect home. In this home nest that you have decided to build, there will be gay gatherings of happy people; there will be quiet, peaceful hours to be spent in rest and recreation; there will be work to do; there will be weddings, births, sick ones to be nursed, deaths, funerals. The sad side of life cannot be canceled by the architect, the artist, or the builder. But these, intelligently exercising their skill, may do much toward lessening the unavoidable ills of life. They can plan, and build, and decorate in accordance with known sanitary principles.

Health, above all things else, ought to be the first and paramount consideration in the construction of this house you propose to build. To this object all other desires should be subordinated. Of course the site selected must be salubrious, but even upon a perfectly healthful spot of land it is easy to rear a manufactory of disease. There are many—far too many—such houses to be found. The doctor’s bills paid in this country by reason of unsanitary plumbing, unsanitary heating, bad ventilation, and lack of ventilation, probably would aggregate a sum ample to cover the first cost of sanitary construction, to say nothing of the pain and suffering endured by both sick and well that such construction would save.—*Engineering Magazine*.

Dr. Griffin—I must say the world is very ungrateful toward our profession. How seldom one sees a public memorial erected to a doctor!

Mrs. Golightly—How seldom? O Doctor, think of our cemeteries!—*London Globe*.



THE MUSCLES.

How does the nerve impulse cause the muscle to act? The muscle, as we have shown, has stored up in itself a quantity of glycogen and oxygen. That is really explosive material; but these two substances must combine. Glycogen alone will not explode any more than will charcoal. Oxygen will not explode alone; but if you mix these substances in a certain intricate manner, you will have a substance that is explosive. The same is true of glycogen and oxygen; when mixed together in the muscle fiber, they become an explosive substance. Here, we will say, we have a mass of gunpowder and a percussion cap; from this point we will arrange a row of bricks; they are arranged on a level surface, and at such a distance apart that when one brick falls over, it will touch its neighbor brick and cause that to topple over against the next brick, and so on, until the last one falls, and this one connects with the gunpowder. Now the first brick may be so nicely balanced that a slight breath of air may cause it to tip over against the next brick, and that brick will fall against the next, and though the procession of bricks may be a mile long, yet by this means the last brick will fall and strike the percussion cap, and there may be a tremendous explosion, and a large amount of damage done.

This is a good illustration of the way in which the nerve cell causes the muscle to contract. Each of these little nerve fibers, about three inches long, has its own nerve cell in the brain, so that the fibers which constitute the whole muscle, are represented by quite a community of motor cells located somewhere in the brain or spinal cord. These motor cells from which the nerves originate, store up energy; they have the power of originating impulses, and this is the manner in which they work. The

secreting cell—the gland cell—has the power of elaborating substances; the liver cell makes bile; the salivary gland makes saliva; the cells in the stomach make gastric juice, and in the same way the nerve cell makes impulses, and when it does so, it sends the impulse along down this line of communication, and when it reaches the muscle, it causes the oxygen and the glycogen to combine, and then we have an explosion which we call muscular contraction.

But this is not the ordinary contraction of the muscles by which work is done. If I should strike only one blow upon my knee, the contraction would cease instantly; but if I continue tapping the knee very rapidly, the muscle will be drawn up and held there. That continuous contraction of the muscle which is the result of a rapid succession of stimuli, is called tetanus; that is, when one contraction combines with another. Now in ordinary muscle contraction,—when you squeeze your hand, for example,—this is tetanus; the nerves are automatically sending out a succession of impulses. It has been determined that the nerve centers send out impulses at the rate of from ten to twenty impulses per second, which are telegraphed along down the nerve fibers, and keep them contracted; you would let go your hold after the first contraction, if the stimulus were not repeated again and again and again; so the contraction is continued, and the object is held.

It is very interesting to notice in the nervous system, how closely nerve impulses correspond with other kinds of stimuli. In order to study this subject, biologists and physiologists have taken the muscles of frogs and separated them from the frog itself, taking pains to injure the muscles as little as possible, and it is found that if the muscle is kept

in a low temperature, it may be kept in good working condition four or five days or even longer, after being separated from the animal. This is done by means of an arrangement by which an electric current may be applied to the muscle, either directly, or to the nerve which controls it.

Let us notice some things which happen when a muscle contracts. One of the first things is a change in the shape of the muscle; the muscle shortens and thickens, as we may notice in the contractions of the muscles in the forearm. This change of the muscle is due to a change which occurs in each individual fiber of which the muscle is composed. When the fiber contracts, it is thickened at the same time; still it is about the same volume as before, slightly less. Other phenomena occur when the muscle contracts. When the muscle is active after contracting, it throws off a great quantity of carbon-dioxide or CO_2 . This is necessary. When gunpowder explodes, there is a great quantity of smoke; so when the oxygen combines with the glycogen in the muscle, we have precisely the same effect produced; we have carbon-dioxide, or CO_2 , produced, the same as by the explosion of a quantity of gunpowder.

Now when we have this formation of carbon-dioxide, or CO_2 , we would expect heat, and so we have. It is found that an active muscle always has a higher temperature than an idle muscle. There are other changes which occur, but these are the most important. There is another change which I must mention, and that is the production of a poisonous substance in addition to the CO_2 ; this substance is of a very poisonous character. This is especially produced by the action of the muscle itself. We have also, as before remarked, nerve impulses acting upon muscle about ten to twenty times per second; there is a muscle contraction and a vibration every time a nerve impulse occurs. If we had a big tuning-fork, instead of a muscle, and it should be set to vibrating from ten to twenty times a second, we would expect that sound would be produced, and so it would.

Yes; we have sound produced by the muscles. We can hear it when we put our fingers in our ears.

(To be concluded.)

A CARNIVAL of sports, in connection with the Columbian Exposition, is contemplated and quite likely to be established. It is proposed to provide a large arena, or amphitheater, in which will be enacted, as far as possible, every kind of athletic sport known to the various nations and races of the earth.

It is hard to tell just what sort of sound it is: it is like a low, deep, throbbing note of a big church-organ—those low notes which seem to shake the building, and cause the seat upon which you sit to vibrate so that you can almost count the pulsations. These sounds which you now hear in your ears must be the lowest notes of the grand pipe-organ, only an octave lower, for you do not hear the real sound which the muscle produces, that note being a little too low for you to reach; it is an octave higher. You will notice that these pulsations are much quicker than the heart-beat, but correspond very closely with what I have just described. This is muscle-music, and in this way the muscles go singing about their work.

A very interesting subject in relation to the muscles is the amount of work done by them. The work done by the muscles is determined by simply multiplying the weight in pounds by the number of feet through which the weight is lifted; the result is called foot-pounds. Suppose we have a weight of fifty pounds to be lifted through a distance of five feet: $50 \times 5 = 250$ pounds,—in this case 250 foot-pounds. Muscle work or mechanical work of any kind is represented by foot-pounds, or foot-tons; that is the way we determine the amount of work done by the muscles. In making experiments with muscles in order to find what the ability of a muscle is, we take a portion of a muscle the surface of which is equal to an inch square, as a foundation, the calculation being based upon this sectional area of a muscle, when the muscle is cut in two. The ability of muscles to lift, differs greatly in different classes of animals; for example, in a frog, a square centimeter section of a muscle lifts six and six tenths pounds, while the same section of the human muscle lifts twenty pounds. This calculation can be made for a live muscle as well as for a muscle that has been removed from a body. It is found that the amount of work which the muscles will perform, is the greatest when the muscle begins to contract, and its lifting ability lessens until it has been reduced to its shortest limit, when its lifting power is very small indeed, or a very small proportion of its maximum power.

EVEN if the strong man does occasionally become jaded, he knows how to get back his strength and snap, and that a tired man is many removes from a tired-out one. There is a great deal in knowing whether your work is overdoing you or simply tiring you.—*Prof. Wm. Blaikie.*

HOW PHYSICAL EXERCISE ACTS UPON THE SYSTEM.—An eminent English physician, Dr. Ray Lankaster, says: "The employment of the muscles in exercise not only benefits their especial structure, but acts on the whole system. When the muscles are put in action, the capillary bloodvessels with which they are supplied become more rapidly charged with blood, and active changes take place, not only in the muscles, but in all the surrounding tissues. The heart is required to supply more blood, and accordingly beats more rapidly in order to meet the demand. A larger quantity of blood is sent through the lungs, and larger supplies of oxygen are taken in and carried to the various tissues. The oxygen, by combining with the carbon of the blood and the tissues, engenders a larger quantity of heat, which produces an action on the skin, in order that the superfluous warmth may be disposed of. The skin is thus exercised, as it were, and the sudoriparous and sebaceous glands are set at work. The lungs and skin are brought into operation, and the lungs throw off large quantities of water, containing in solution, matters which, if retained, would produce disease in the body. Wherever the blood is sent, changes of a healthful character occur. The brain and the rest of the nervous system are invigorated, the stomach has its powers of digestion improved, and the liver, pancreas, and other organs perform their functions with more vigor. By want of exercise, the constituents of the food which pass into the blood are not oxidized, and products which produce disease are engendered. The introduction of fresh supplies of oxygen induced by exercise oxidizes these products, and renders them harmless.

All other things being the same, it may be laid down as a rule that those who take the most exercise in the open air will live longest."

BREATHING EXERCISES.—Breathing exercises are of great value, most easily practiced, and give excellent results. It is not necessary to have an elaborate system. The nostrils are the proper organs of breathing. Man, unlike some other animals, is capable of breathing through the mouth if the nostrils are obstructed, and many from habit or debility continually do so,—a practice, whether by day or by night, attended with many evils; whereas every breath of pure air a man inhales through his nostrils is a breath of life.

One exercise, repeated fifty or a hundred times a day, requiring no more than ten minutes all together, is of the greatest advantage and can be done out of doors as well as in, at almost every season of the year. It consists in inhaling through the nostrils a deep breath, retaining it a few seconds, and then, with the lips adjusted as if one intended to whistle, expelling it slowly through the contracted orifice. There is no physiological objection to exhaling through the mouth; there are no muscles whereby the course of the breath can be restrained through the nostrils; but the lips contain sufficient muscular strength for this purpose. If students would rise from their studies, book-keepers from their desks, women from their sewing or reading, two or three times a day, and take from fifteen to thirty such breaths, the results would surprise them.—*Dr. J. M. Buckley, in Chautauquan.*

THE OBJECT OF PHYSICAL CULTURE.

PHYSICAL training has for its object much more important purposes than the mere development of strength or muscular force. A misconception of the ends sought in physical training, or at least the lack of appreciation of them, is doubtless responsible for much of the neglect and apathy shown regarding this important branch of education. The purposes of physical training are manifold; the most important ones may be briefly stated as follows:—

1. To develop and maintain a high state of bodily health. Vigorous exercise is the only means by which the heart and lungs, which together constitute the great central engine of the body, can be developed to the highest state of efficiency. The heart and lungs of a sedentary man or an animal reared in

confinement are always weak, and liable to fail when brought under the strain of an emergency. The activity of the skin, kidneys, liver, and other excretory organs, as well as the nutritive processes of digestion and assimilation, are equally dependent upon exercise. The kind of exercise is not of so great importance for these purposes, except that it should not be too violent. The important thing is, that the exercise should be sufficient to bring the bodily powers into vigorous and active play.

2. Another very important purpose of exercise, very generally ignored, is to keep the body young. The degenerative changes which constitute old age, beginning in the heart and bloodvessels, and thus affecting the entire body, may be postponed to a re-

markable degree, by abundance of active physical exercise habitually taken. Overwork is as damaging — perhaps even more so than deficient exercise, but a proper amount of suitable muscular work is the best of all means for promoting longevity and postponing joint-stiffness, muscular weakness, and the general feebleness of old age.

3. Symmetry of form, or a good physique, can be secured in no other way than by symmetrical development of the muscles. For this purpose, great care must be taken to develop the whole muscular system equably, thus securing good poise, or a natural and graceful carriage of the body.

4. *Muscular Strength and Endurance.*— These objects are not mentioned first, because we cannot consider them by any means first in importance, nevertheless, their value is so great as to secure for them the highest appreciation. A man possessed of great strength of body and the endurance which comes from habitual, vigorous use of the physical powers, other things being equal, has an enormous advantage over those who are lacking in these physical qualities. Symmetrical development of the muscular system, and ability to endure severe or long continued muscular activity, can be acquired only by a carefully conducted course of physical training.

5. Muscular control, from which result grows an agility of movement, and that indefinable but very tangible and highly appreciated something which has been aptly termed "physical expression," is one of the most useful results of carefully conducted phys-

ical training. It should be noted, however, that mere muscular work will not secure the results referred to under this head. Different forms of exercise and different systems of physical training produce widely varying results. Heavy exercises produce great strength, but also heaviness, even clumsiness of movement, and contribute nothing toward the development of good physical expression. Active exercises, and especially those which bring into full play the nerve-centers, the nerves and muscles concerned in balancing the body, are especially useful. Exercises which act specially upon the nervous system are of greatest value.

6. Last, but not least, must be mentioned the important influence of physical training upon the mind and character. Properly conducted exercises develop the physical judgment, such as measuring distances, and the position and rate of the movement of bodies with the eye, and accurate determination of the amount of force required to accomplish a given end. The development of this faculty gives physical courage and self-possession. It is no doubt one of the best of all means of combating timidity. The power of accomplishing a difficult gymnastic feat gives to a youth a kind of courage and self-confidence which enables him to overcome other than mere mechanical obstacles, and the self-possession acquired by such exercises gives him a readiness in emergencies, which if not possessed as a natural endowment, could not be obtained in any other way than by suitable gymnastic exercise or its equivalent.

CARDINAL GIBBONS AND PHYSICAL CULTURE.— An article recently appeared in the *New York World* describing the personal habits of Cardinal Gibbons, and referring to the fact that he is a great pedestrian. Dr. Edwards, editor of the *Annals of Hygiene*, addressed a letter to the Cardinal, making special inquiries respecting his habits in this regard, and received from him in reply, a statement that it is his regular habit to walk from two to four miles every afternoon, besides half an hour's walk in the morning.

Walking is certainly a most excellent means of protecting the health, and is, as Cardinal Gibbons himself believes, one of the means of enabling this eminent man to perform so efficiently the onerous duties of his position, without impairing his physical vigor. Thousands of men engaged in sedentary employment, and who break down while thus engaged, wrongly attribute their breaking down to

overwork, or to the nature of their employment, when, if they would habitually accustom themselves to a proper amount of daily physical exercise, they would have no reason for complaining either of their employment or of their physical condition.

Three or four miles a day, however, is hardly a sufficient amount of exercise for an ordinary man engaged in sedentary work. A ride of from eight to twelve miles on a bicycle, or a five to eight miles' walk would not be an excessive amount for an average brain-worker, and some ought to do much more than this. Charles Dickens used to walk from ten to twelve miles before breakfast, and not infrequently took much longer walks,—twenty-five to thirty miles before eating his morning meal.

DEVELOPMENT of the shoulder muscles tends to invigorate the chest, and a fifty-cent hand swing may save many dollars' worth of cough medicine.—*Oswald.*



THE PRINCIPLES THAT SHOULD GOVERN WOMAN'S DRESS.—A contemporary makes the following abstract of the publicly expressed opinions of a woman artist of note in European circles, concerning the principles which should govern feminine dress:—

“Madame Starr Canziani, who has been for years one of the best known exhibitors at the Royal Academy, makes the pertinent inquiry: ‘If the laws of health and beauty were more generally understood, would it be possible that such enormities could exist as tight lacing, high heels, and pointed toes?’ She thoroughly condemns tailor-made gowns, because ‘they give no scope for graceful, natural movement. In these, the figure is made to fit the dress, and not the dress the figure, and if the wearer but lifts her arm above her head, she feels as if she must burst.’ . . . Answering the question of what constitutes fitness and womanliness in dress, she says: ‘To be beautiful it should be the expression of a beautiful mind, a beautiful body, and of perfect health and ease, and of natural delight in movement.’

“The Greek dress she thinks was the most beautiful dress of all times and countries, and does not see why it should not be adopted for evening dress, or at any time when the wearer is not exposed to wind and weather. The principles governing classical Greek dress should be our guide in all costume. Our garments should be garments with a meaning and a purpose. We should never contradict nature’s simple lines by false protuberances or exaggerations. To be beautiful, clothes should, by their shape, express the figure underneath. The gown should also be in harmony with the character of the mind and form of the wearer, and while quaintness of cut and even elaboration may be appropriate to a merely pretty woman, and, discreetly used, may give interest to a plain one, only the very simplest and most flowing forms are worthy of the noblest type of beauty. No one could imagine the Venus of Milo in ribbons or frills, but wrap her in a sheet, and her beauty will

still dominate the world. Dress need not be Greek in form to be Greek in spirit; we only need look, and we shall find the following noble qualities in Greek dress: Fitness and honesty, simplicity, modesty, and dignity.”

LONG SKIRTS.—The reappearance of the once obsolete fashion in ladies’ dress which countenances the wearing of long trains upon the street as well as in the parlor, has given the London *Lancet* occasion for a vigorous attack upon this means of diffusing the germs of disease. The *Lancet* well says: “Granted that the germs of disease abound in a given quarter, no ordinary means could more effectually insure their disappearance than the broom-like action of a flowing skirt.” Any one who has the slightest knowledge of microscopy or bacteriology will readily recognize the truth of the statement that nowhere are germs, and germs of the most dangerous and miscellaneous character to be found so abundantly as in street dust. The expectorated matters of the thousand passers-by on the sidewalk or public highway contain every sort of germ which infects the human body. In the dried sputa of the multitudes who pass one another upon the street, expectorating here and there, may be found the germs of diphtheria, pneumonia, erysipelas, cancer, consumption, and other most formidable microbes, together with those of a less dangerous character, such as those giving rise to decay of the teeth, sore eyes, inflammation of the ears, and numerous other minor maladies. Horses and other animals traversing the street are constantly soiling the pavement with excreta which contains multitudes of microscopic organisms capable of producing various forms of disease, including the eggs of tapeworms and other parasites. The smallest bit of street dust planted upon a sterilized potato, will grow in a short time to proportions really prodigious, when compared with the original particle. It is only by such studies that one can be made to appreciate the real character of street dust.

The sweeping train churns up a portion of this miscellaneous assemblage of mischief-making microbes into a floating cloud, which is drawn into the mouths and nostrils of the passers-by, while another portion adheres to the skirts and underclothing of the wearer, and is carried home to be deposited on the elegant carpets, velvet mats, and Turkish rugs of parlor floors, whence they are again swept into the air to settle down upon lace curtains, table-spreads, picture-frames, window-sills, chairs, and every other article within the house, whence they are again sent afloat by every movement which disturbs the dust-covered articles, and especially by the feather-duster or the wiping-cloth of the chambermaid, in her daily round.

The gravity of this evil certainly justifies the action of the Sanitary Board of Hungary, which has instituted a crusade against this pernicious fashion. The subject is also warmly agitated in Vienna and Pesth, and quite likely similar action will be taken by the authorities of those cities and the countries which they represent.

DR. HOLMES ON DRAGGING SKIRTS.—Dr. O. W. Holmes, in his "Professor at the Breakfast Table," puts the following language respecting dragging skirts, into the mouth of one of his characters:—

"The Little Gentleman began: Our landlady's daughter is a young lady of some pretensions to gentility. She wears her trains very long, as the great ladies do in Europe. To be sure, their dresses are so made only to sweep the tapestried floors of chateaus and palaces, as those odious aristocrats of the other side do not go dragging through the mud in silks and satins, but, forsooth, must ride in coaches when they are in full dress. It is true that, considering various habits of the American people, also the little accidents which the best kept sidewalks are liable to, a lady who has swept a mile of them is not exactly in such a condition that one would care to be her neighbor. Why, there isn't a beast or a bird that would drag its tail through the dirt in the way these creatures do their dresses!

"Because a queen or a duchess wears long robes on great occasions, a maid-of-all-work or a factory girl thinks she must make herself a nuisance by trailing through the street, picking up and carrying about with her—pah! That's what I call getting vulgarity into your bones and marrow. If any man can walk behind one of these women, and see what she rakes up as she goes, and not feel squeamish, he has got a tough stomach. I would not let one of them into my room without serving them as David served Saul at

the cave in the wilderness—cut off his skirts, sir! cut off his skirts! . . . Don't tell me that a true lady ever sacrifices the duty of keeping all about her sweet and clean to the wish of making a vulgar show. There are some things that no fashion has any right to touch, and cleanliness is one of these things."

OUTRAGES UPON NATURE.—No lady can be really well clothed if her dress outrages nature's intentions in the structure of the human frame. Such outrages are, a waist like a stovepipe, shoes that compress the toes into a cramped mass of deformity, and, it might even be added, gloves that confine the hand till it looks little better than a fin; the foot is irredeemably ruined to the destruction of spring and grace in movement, and to no inconsiderable injury to health. No doubt the crumbled clump of deformity common from wearing modern abominations is a thing an ancient Greek would have shuddered at.—*Professor Geo. F. Watts.*

THE N. Y. *Sun*, in an editorial on dress reform, says that "until the women of Fifth Avenue set the fashion of dress reform, there will be no reform in the feminine costume in any quarter, though nothing is more obvious than the total inappropriateness of the present dress of working women. Distinctions in dress which mark distinctions in employment, are intolerable in the eyes of women."

LADIES talk much of visiting the dwellings of the poor in order to teach and preach to them the ordinary rules of sanitation; let us hope the short skirt worn by the poorer classes may be a lesson of cleanliness and sanitation to the ladies themselves.—*English Paper.*

THE *Pittsburg Dispatch*, in commenting on women's fashions in dress, hits off long skirts for street wear in this style:—

"Dark trimmings at the bottom of skirts are stylish just now. No *Pittsburg* lady need be out of this fashion after walking two blocks!"

REFORMATORY ideas in woman's dress are gaining a foothold in Boston and Chicago more than elsewhere.

"Now that I have my bran-new train,"
She said with joyous smile,
"I think I'll take a little walk
And clean the streets awhile."

SOCIAL PURITY

IMPORTANCE OF SYMPATHETIC RELATIONS WITH OUR CHILDREN.

It was the seer Coleridge who wrote, with his usual keen perception of truth,

"A mother is a mother still —
The holiest thing in life."

Even the most abject mother must, he would say, ever be to her child the woman of women. Yet this fact does not make it a whit less important that we should use all our efforts to make ourselves worthy of the best that a child can give us—its confidence as its trusted adviser.

How, then, shall we prepare ourselves to occupy a position so exalted? To some of us, perhaps, this question is not yet a serious and important one, for it is not forced upon us while our children are very young, as it is at a later period. Then we wake up suddenly, as from a dream, and find them forming their opinions of the world around them, and settling themselves into ways of action without assistance from us. Perhaps we feel that the cord which bound them to us has been broken, and that it remains for them to drift farther and farther from us.

We feel our helplessness, at least, and the thought thrusts itself upon us that, while we have been caring for their bodies and minds, we may have neglected the far greater need of their souls. It seems to me that we cannot begin too early to establish confidence and sympathy between ourselves and our children. Are we not apt to feel, when we have attended to their daily recurring wants,—have seen them properly fed and well clothed, and have done everything that we think necessary for a sound physical and mental development,—that our duty is done? Perhaps we have added to this a watchful care of their morals and manners, have endeavored to check all evil tendencies and habits, and to make their outward deportment correct.

Is this our whole duty? Have we not overlooked the very important needs of their souls, their higher being? They crave sympathy, long for some one in whom they may confide; and do we not sometimes fail to respond to these outgoings of their hearts, and thereby discourage them from coming to us with

the pleasures and troubles of every-day life? If we do, it is not strange that they seek others to whom they can sometimes open their hearts; and who can assure us that they will not throw themselves into the toils of those who may prove wholly unable and unfit to offer them that which it is our privilege to give—persons whose pernicious influence will be felt throughout their lives?

Children have many questions to ask about this world into which they have been brought, and about their own being, which can be judiciously answered only by their mothers; and, if we encourage them to come to us with these, we may save them from many wrong habits of thought and of life. Do we sufficiently realize the temptations and perplexities which surround their young lives? If we do, can we ever think the time wasted that we take from our engrossing occupations to listen to all that they have to tell us? Do they not have far greater strength in resisting temptation when they are perfectly sure of our constant, loving sympathy? I have heard more than one young girl say, "I could never speak of such and such things to my mother." Could this ever have been said if the mother had begun aright? Who else in the wide world has so strong a claim upon the child's confidence at first? Who is so well fitted to give counsel and sympathy?

Let us now consider what are the best methods of securing this confidence and establishing this sympathy. Tact seems to me to lie at the foundation of all efforts to this end. The word conveys the idea of gentle, skillful touch, of knowing how to handle delicate materials in the most judicious manner. Perhaps some of us may think she has no tact; but may it not be cultivated? We cannot easily learn to read with our fingers while we have eyes to see; but when light is taken from our natural organs of sight, how quickly does necessity enable us to conquer the difficulties of the strange and marvelous page that to be read must be touched.

I think that if we feel the importance of a sympathetic relation with our children, of having a good

understanding with them, more perfect than any other man or woman can ever establish, we shall surely find many ways in which it can be cultivated. Some children offer more difficulties in this attempt than others; but this only gives greater scope for the exercise of tact.

In my own experience, I have found the "children's hour," just before bedtime, the most favorable for quiet confidences. It is the time of which Longfellow sings,—

"Between the dark and the daylight,
When the night is beginning to lower,
Comes a pause in the day's occupations
That is known as the Children's Hour."

Children are always ready to give their hearts to their mothers; and though this hour is the one when we are most weary, and impatient for the quiet that will be ours when they are all in the arms of Morpheus, I am sure we can never regret the moments that we give up for this holy purpose; for it may be that the lessons then taught will linger longest in the memory and be most helpful in years to come.

If we may be companions as well as guides and teachers to our children—entering into all their

secret lives, and making them feel that we share all their joys and sorrows (little as some of them may appear to us), why should we not establish the delightful relation now, trusting that we may be able to continue it as we all grow older? If we cultivate wisely our own minds and hearts, and foster a teachable disposition in ourselves, will our children ever have reason to complain that we have not kept pace with them—that they have looked to us in vain for sympathy and encouragement? Happy that mother whose efforts in this direction can inspire her son to sing to her, in the words of the poet, Henry Kirke White,—

"And canst thou, mother, for a moment think
That we, thy children, when old age shall shed
Its blanching honors on thy weary head,
Could from our best of duties ever shrink?
Sooner the sun from its high sphere should sink
Than we, ungrateful, leave thee in that day
To pine in solitude thy life away,
Or shun thee, tottering on the grave's cold brink,
Banish the thought; where'er our steps may roam,
O'er smiling plains, or wastes without a tree,
Still will fond memory point our hearts to thee,
And paint the pleasures of thy peaceful home,
While duty bids us all thy griefs assuage,
And smooth the pillow of thy sinking age."

— "Mothers in Council."

FUNDS FOR A RESCUE HOME.—The *Church Union* devotes considerable space in its columns to a call for funds to aid a small band of the Salvation Army, at Cleveland, Ohio, in the purchase of a site for a "Rescue Home." They have a very eligible site offered them in that city for \$4000, \$1000 down, and the balance in four yearly payments. The Army is trying hard to raise the \$1,000 so as to secure the property, and will be glad of aid from any quarter. Their object is to rescue fallen women and girls, care for them, and find them situations, the "mother" of the Home afterward keeping track of them and encouraging them in their new life. The crying need of such a home in Cleveland is emphasized by the following case, related by the writer of the communication in the *Church Union*, to which we have referred:—

"A sad case was noticed in the Huron Street Hospital by some West Side ladies who were visiting it. A poor, unfortunate child-mother, who came there about a month ago, had been told that, according to hospital rules, her time was up, and she would have to find another home. Taking her little one in her arms, she started out on her quest for work. Weak, ill, and burdened, she met with no success, and that night she staggered back and fell fainting upon the steps of the hospital. They took her in and kept

her, not knowing what to do, and some philanthropic ladies were told of the circumstances. They stated the case to some members of the Army, who at once took the poor outcast and her child home to their own quarters, where they were comfortably provided for."

Contributions of all kinds for the above-stated object will be gratefully received, and should be sent to Major or Mrs. Henry Stillwell, 287 Kinsman street, Cleveland, Ohio.

VICE SETS ITS SEAL.—A late writer on social purity says that "even impure thoughts, habitually indulged, may be revealed by a permanent change in the expression of the countenance. Though a man imagines that no one suspects what is passing in his mind, the lines of his face may become so altered by foul imaginations that pure women shrink when he speaks to them, and even men of the world say they 'somehow don't like that fellow.' We read that 'the books shall be opened.' They are being opened now, for the record of a man's inmost thoughts are legibly spread on the open page of his countenance, and though he thinks not of it, he may be already delivered over to 'everlasting shame and contempt.'"



SECRET REMEDIES IN GENERAL, AND THE KEELEY CURE IN PARTICULAR.

WE quote the following article from the able pen of Dr. Ezra M. Hunt in the *N. Y. Independent*, of June 23:—

“The phenomena of psychology, as related to disease and to the professed discoveries of remedies, form one of the most remarkable records in the history of man. It is not wonderful that the person, or the loving friends of a person afflicted with any serious malady should, like the drowning man, catch at straws. It has ever afforded a field not only for that pretense which is so easily dismissed as humbug or quackery, but for the exercise of those mental arts which smart, discerning men often acquire. There is, in such, a continuation of ability and tact, of ready adaptability and enterprise, and a keen use of business methods such as often insures success. The more we examine spiritual mediums, Christian Science, faith cure, hypnotism, cures by suggestion, control of the will power of others, and all the range of devices so often culminating in some secret remedy or some claimed special powers either of faith or knowledge, the more we see how results are attained. The fact that under profound impression or right discipline there are now and then real cures, serves to herald the new healer, and enables him to attribute to his method or remedy some wonderful powers. It complicates the truth still more, that while the ignorant and superstitious are the most ready victims, not a few of the learned or the good are caught. Just as the man of decision of character may now and then topple over into obstinacy, so real faith is often alongside of superstition and credulity. Not only the unlearned say, ‘Seeing is believing.’ We have watched whole crowds swayed by the magic of some medicine man, and have seen learned professors and eloquent divines duped in a way and to a degree most marvelous. Dr. Buckley did good service

when, in his articles in the *Century*, he showed some phases of wrong beliefs and the methods by which they obtained standing.

“About forty years ago all London was agog at the wonderful cures of St. John Long. He so disturbed regular practice and so commanded the attention of the nobles as well as of the common people that even the scholarly Watson cautions against him in his standard work on the ‘Practice of Medicine.’ ‘The results,’ says a recent writer, ‘which followed the practice of this astute quack were practically the same as those we see repeated year by year in one place or another.’ The secret which Long sold, it is said, for three thousand pounds to a lady of fashion, turned out in the end to be no secret at all. The famous liniment which constituted a chief part of the treatment proved to be nothing but spirits of turpentine and strong acetic acid. One day a diffused cellulitis gave rise to serious charges and defense, the secret came out and was exploded. Lately the Mattei Cancer Cure has even compromised the otherwise good judgment of a great editor. A recent number of the *Lancet* furnishes the following outline of the ‘Vitaline Craze’ which has excited Russia:—

“‘To call it consternation is not too strong a term; for although we do not accredit the statement that ten thousand people in Russia have received injections of the stuff “Vitaline,” there is without doubt a panic on the subject of this injection—this most absurd so-styled “rejuvenator” of old idiots and antidotal preserver of young ones. The story of the “discovery” of this new “remedy” is an old story revived. A wanderer from his native land, this time one Gatchkowsky, an engineer, was sent on his own business into the Trans-Caspian territory, and there, among a primitive people, he heard of a new specific. “A Chinese *savant*” revealed to him the

particulars of a miraculous compound medicine, which, being instilled into the blood of man, would cure everything; it was more than a mere panacea; it was a "rejuvenator," a curer of such fatal diseases as consumption of the lungs, without fail. All previous wonders were to be surpassed by it, and the scientific world was once more to be set in commotion by a discovery that would show how natural law in disease could be overthrown in wholesale fashion.

"For a time—happily short, yet long enough—the new practice made its way, and we are told regular practitioners of medicine in St. Petersburg were dumbfounded by the presence of the "tide of fashion and of favor" that set in. To some invalids, real or supposed, the "Vitaline" was administered by injection subcutaneously; to others it was administered internally. Prices for the remedy and its application varied; the rich paid largest fees, but the poor also paid, and some of them also largely. The Czar himself was counseled to let his son, the Grand Duke George, undergo the treatment. At last a somewhat less important man, but still one of great importance, was subjected to the remedy, and he, General Gresser, the Prefect of St. Petersburg, and one of the firmest and shrewdest of the guardians of the imperial power, was led to submit himself to the operation, and by the submission sacrificed his life. How, precisely, the sacrifice was brought about we have as yet no satisfactory details. The discoverer of "Vitaline" turned around, in his defense, from the sublime to the ridiculous. The omnipotent remedy at once diminished from its potency into a mere mixture of borax and glycerine—a harmless mixture for good or evil. If death resulted from the use of it, a dirty syringe used for the injection must have been the true cause; but M. Gatchkowsky, having made a clean breast of his discovery, will practice the art of cure no more; and if he be not, in the panic, charged with political of-

fense and of systematically poisoning the Prefect, he is fortunate.'

"Just now, and for a year past, the country has been suffering from a similar craze from a new Keeley motor, known as the Keeley Liquor Cure. It has in it many elements of sensationalism and empirical success. It first talked of 'bichloride of gold,' since a form of gold treatment had been given some prominence abroad, but as there is no such chemical as 'bichloride of gold,' the name does not now so often appear. It was the hypodermic syringe, which is a fascinating way of taking medicine. It deals with a dire habit, any possible remedy for which is sure to attract the attention of victims and of friends. It gives opportunity for the aid of the will-power of others, and shrewdly has its hospitals in imitation of inebriate homes, which no doubt have done much good. It is able to show results, since reformed drunkards are no new thing, and since exultant hope always tries to believe the reform to be permanent. Beyond this, the whole device shows nothing that has not occurred over and over again. The claims and recommendations are just those which have been procured for multitudes of patent medicines, whose names are now known only by records. Skilled inquiries on the part of physicians and of those acquainted with methods of dealing with inebriety fail to show any results which betoken the discovery of a new remedy. Other records show that many have been injured, and have been hurried to asylums and to death. Most sorrowful of all is it to witness such an exhibition as was conducted a little while since in a Brooklyn pulpit, and to see an ordinary, although acute, adventurer canonized as a benefactor to the race. There is a great peril to public confidence when one prominent pulpit advocates moral beer and wine saloons, and another accepts as a remedy for their excessive results, the impossible cure of a keen business charlatan."

POISONING BY "CHLORODYNE."—A case of poisoning by this drug, which recently occurred in England, has led to the decision by the magistrate, that this article, as well as all other proprietary articles containing scheduled poisons, must be labeled "Poison," in addition to the name which the medicine usually bears. As chlorodyne contains both morphia and chloroform, two well-recognized poisons, it is certainly appropriate that this drug should bear a warning label, the same as any other poisonous substance.

Many lives are now annually sacrificed, either by acute poisons, from the use of some powerful drug, like

chlorodyne, or by slower poisoning induced by the continual use of some less poisonous drug. When the public have thoroughly learned the fact that most patent medicines are either useless or poisonous, the number of lives annually sacrificed in this way will be materially lessened.

It is to be hoped that a similar law will be enacted in this country, so that every poison-monger will be compelled to label his nostrum in such a way that the purchaser will be thoroughly warned of the nature of the mixture which he proposes to swallow, in time to prevent mischief if he chooses to avoid it.

GOOD HEALTH

J. H. KELLOGG, M. D. EDITOR.
BATTLE CREEK, MICHIGAN.

PUTREFACTIVE GERMS IN THE FLESH OF HEALTHY ANIMALS.

THE fact that germs are always to be found in the flesh of dead animals has long been known, but it has been only recently determined by careful scientific experiments, that germs which are really dangerous to life and health appear in various parts of the bodies of dead animals within a few hours after death. The principal resorts of these germs are the lungs and the alimentary canal, into which they are received by the acts of breathing, eating, and drinking. We quote the following from an editorial in the *Bacteriological World and Modern Medicine* for July, 1892:—

“The exceedingly interesting culture experiments by Segri Trombetta, bring into clear view facts of very great importance from a dietetic standpoint. These experiments show that within sixteen or seventeen hours after death, at ordinary temperature, and within twenty-four hours after death, at the temperature of an ice-chest, putrefactive processes are already established in various parts of the bodies of rabbits and other animals. The experiments have relation to aërobic germs, the pathological significance of which are well understood. When it is considered that a great share of the flesh of domestic animals consumed as food, is kept for some days after the animal is killed,—usually eight or ten days, and in some instances, so long as two or three months,—the important relation of this putrefactive process to the dietetic value of flesh food must be appreciated.

“Bouchard has shown that meat juice extracted from flesh in which a putrefactive process is going on, possesses decidedly toxic properties, and that the degree of toxicity is directly proportionate to the length of time during which the putrefactive process has been in operation. It becomes evident, then, that the use of flesh food more or less heavily

charged with the toxic products of putrefactive micro-organisms, must be a source of injury to the vital economy. That we are not sensible of the influence of poison on every occasion when such food is used, is solely due to the fact that the liver is endowed with functions which enable it to counteract the influence of organic poisons by oxidizing them, or in some other way diminishing their activity. Nevertheless, it must be apparent that the imposition of a great amount of this unnecessary work upon the liver will result in an interference with the performance by this important organ, of its natural and legitimate functions; consequently, its work of eliminating the natural poisons of the body, in the production of bile, as well as its glycogenic functions, must be more or less impaired. Is it not possible that this is the source of quite a large proportion of the cases of inactive liver, biliousness, and kindred morbid states which constitute so large a share of the functional disturbances with which every physician is called upon to deal?

“The common practice, especially in England and France, which allows the process of decomposition to advance so far as to give to the flesh the term *haut gout*, must be recognized as not only unwholesome but positively dangerous. In the light of the researches referred to in this article, it is no wonder that persons addicted to the use of such food, which includes in this country a large portion of the flesh consumed as ‘game,’ are subject to frequent attacks of biliousness, sick headaches, ‘running off at the bowels,’ and other conditions indicative of poisoning. The marvel rather is that such persons do not suffer more seriously than they do, and that attacks of fatal poisoning from such sources are not more frequent. The fact that fatal results

do not frequently occur, must not be considered, however, as an evidence of the innocuousness of such a diet.

"The evil results of such transgressions of the laws of health are most often recognized, not in directly fatal consequences, but in indirect ways; for example, the man who uses up his liver energy in the consumption of ptomaines taken in with his food, has but little liver capacity upon which to fall back in case of a fatal emergency arising from exposure to malaria or micro-organisms, the reception of which the system is not able to avoid. One cannot always select to his satisfaction the air which he inhales

into his lungs, or even control to a nicety the character of the water which he drinks; but he can, if he will, at least under any but the most extraordinary circumstances, avoid the dietetic use of ptomaines in the form of putrefying meat.

"In view of these facts, as above stated, it seems very clear that every State Legislature would be amply justified in the passage of a law prohibiting the sale of undrawn fowls or other small animals, which are always in a state of advanced decomposition when offered for sale in the public markets, as evidenced by the greenish color of the flesh, especially in the abdominal region."

ASTONISHING MEDICAL ADVICE.

A CERTAIN Eastern hospital has recommended that women whose nerves are irritated by small worries should calm them by resorting to smoking "if their doctors recommend it." This suggestion has caused a protest prompted by horror or disgust that the fair sex should be recommended by medical authority to assume the pipe, the cigar, and the cigarette, which, for the most part in this country, have been monopolized by men, smoking by women being chiefly confined, as one writer well says, "to the fast and the loose." Some voices have been raised in defense of the surgeon, however, Mr. James Payne maintaining that there is no more reason why men should have all the benefit of tobacco, than, as John Wesley observed, "that the devil should have all the best tunes." We rather agree with Mr. Payne. If tobacco is good for men, no reason can be offered why it should not be good for women also. Belladonna, stramonium, strychnia, opium, and even alcohol as well as all other drugs, with the exception of tobacco, are prescribed for human beings without distinction of sex; why, then, does the doctor draw the line at tobacco?

Is there any particular virtue or lack of virtue in man which renders him susceptible to the therapeutic influence of tobacco, which women do not share? If any such sexual peculiarity exists, it has certainly never as yet been pointed out in any scientific work on therapeutics. If the women have been unfairly treated by not being allowed to smoke when they

feel nervous, when their husbands are given full liberty to do so, certainly the injustice ought not longer to exist. If tobacco-using is good for men, it is good for women also. Possibly the assumption of the pipe and the cigar by women, would be the best means of exhibiting to men the enormous filthiness, harmfulness, and costliness of the use of the weed. We are inclined to think that the item of expense would appeal powerfully to the average smoker. How many men who smoke half a dozen twenty-cent cigars per diem would be willing to supply their wives and daughters with an equal number of fragrant Havanas every day of the week? There is always to be found a recognizable relation between smoking and selfishness.

We have no fears that the advice of the hospital will be followed. The women of America are coming to recognize, pretty unaimously, the fact that tobacco is an enemy of the virtue of American women, and of the home, and their voices are being raised in an outcry against this invader of the purity and sanctity of the household; and before many years, doubtless, woman's hand as well as her voice will rise in protest at the ballot-box, in the shape of prohibitive laws against this intolerable nuisance, the tobacco habit, the foreshadowing of which may already be recognized in the passage of laws prohibiting the sale of tobacco to young boys, and its use by pupils attending the public schools.—*Bacteriological World and Modern Medicine.*

STIMULATING EFFECT OF MEAT.—M. Leven, the eminent physician in charge of the Hospital Rothschild, in Paris, in an interesting work entitled "*Estomac et Cerveau*" (brain and stomach), calls attention to the harmful results arising from the free use of flesh food, so common at the present time in

many civilized countries. M. Leven points out the fact that meat exerts an excessively stimulating effect upon the nerve centers which control the stomach, particularly the solar plexus. In demonstrating the fallacy of the popular notion which attaches so great importance to the free use of meat, he cites the ex-

ample of the natives of Southern France, who take meat only once a week, and yet preserve an excellent degree of health, which enables them to engage in the hardest kind of labor in the fields.

BUTTONS ON FIRE.—Many persons will be surprised to learn that celluloid is, in part, a combination of gun-cotton and camphor, and is highly inflammable. It is rather singular that so highly combustible a substance should ever be used for such a purpose as

buttons for clothing. Nevertheless, a case was recently reported in which a lady who was standing near a bright fire, suddenly found herself enveloped in smoke, as the result of the combustion of a celluloid button, which set fire to her dress and came near producing a fatality.

All articles made of celluloid should be carefully kept away from sources of intense heat. As celluloid will ignite without contact with flame, too much caution cannot be used.

THE HYGIENE OF BUILDING MATERIALS.

DR. A. SERAFINI, Assistant at the Institute for Experimental Hygiene, Rome, Italy, has recently published the result of a series of experiments undertaken for the purpose of determining the hygienic properties of various building materials.

One of the questions studied was the porosity of materials of various sorts. This study was conducted by taking small pieces of the material to be investigated, drying them at a temperature above 100°, then placing one end of the mass in very hot distilled water. When sufficient time had elapsed to enable the mass to become saturated with water, the other extremity was immersed. By this means, the air was driven out of the pores of the material as perfectly as possible. After cooling the moistened mass and drying it with bibulous paper, it was placed in a burette (a graduated glass tube) full of water, for the purpose of determining its exact volume according to the principle of Archimedes. The surface was then dried and the mass weighed, then dried at a temperature above the boiling-point, until thoroughly desiccated, and weighed again. The difference in weight indicates the amount of water absorbed by the pores, the percentage relation of the volume of water to the volume of the mass being obtained. The following table exhibits some of the results obtained, the figures expressing the total volume of the pores in the respective materials, compared with the volume of the mass examined:—

Lime rock.....	44.62
Red brick made by machinery.....	32.79
Red brick made by hand.....	36.77
Travertine.....	4.44
Marble.....	0.25
Mortar from an old wall.....	33.88
Fresh mortar prepared in the laboratory.....	35.55

It will be observed that bricks made by machinery and strongly compressed, are much less porous than bricks made by hand.

Experiments were also made for the purpose of determining the permeability to air, of different ma-

terials. Equal amounts of different materials, with equal surfaces exposed and the same pressure of air, gave the results presented in the following table:—

Red lime rock.....	122
Yellow brick made by hand.....	1131
Red brick made by hand.....	222
Yellow brick made by machinery.....	348
Red brick made by machinery.....	122
Travertine.....	11
Marble.....	0
Mortar taken from an old wall.....	15,667
Mortar prepared in the laboratory.....	3700

In another experiment it was found that one square meter (a trifle more than a square yard) of a brick wall two feet thick, one fifth of which was composed of mortar, transmitted in one hour's time, with a pressure equal to that of a water-column of two inches, 600 liters of air, or about twenty-two cubic feet.

It has been found that the amount of air transmitted through a wall in a given time, is diminished by increased thickness, but not in direct proportion to the thickness, since increasing the thickness of the wall five-fold diminished the amount of air transmitted only one half, while increasing the thickness of a wall twenty-five fold only reduced the volume of air transmitted to one fourth.

The conclusion drawn from the last-mentioned experiment is not that which some sanitary authorities have drawn from similar experiments made by Pottenkoffer and others, that walls of buildings composed of ordinary building materials being porous, the artificial ventilation of buildings is a matter of small consequence; but rather, that since the amount of air transmitted by walls is so small, artificial ventilation must be depended upon as the only reliable means of fresh-air supply. A slight computation will readily emphasize the insignificant value of the permeability of building materials as a means of ventilation. An atmospheric pressure equal to a water-column two inches high, which amounts to over ten pounds per square foot, is only produced by a

gale of wind traveling at the rate of forty-five miles per hour; the pressure of a light breeze is 500 times less, and of a strong wind only one twelfth the pressure required to pass through a brick wall two feet thick, twenty-two cubic feet per hour.

It is apparent, then, that the amount of air which passes through the walls of well-constructed brick buildings under ordinary circumstances, must be very small indeed, and utterly insufficient to meet physiological requirements, which demand not less than 2000 cubic feet of air per hour for each person. To furnish this amount, a room with outside walls presenting a surface of one hundred square yards would be required, or a room with two outside walls each twelve feet in height, and something over seventy-five feet long by sixty wide. Two persons would, of course, require a room double this size, and the necessary amount of air would then be furnished the inmates of such a room only when the wind was blowing a gale!

Studies pursued by Dr. Serafini, in relation to the heat-conducting properties of various kinds of building materials, are also of considerable interest. Taking as the unit of comparison, cork, the poorest conductor of heat employed as a building material, the relative heat-conducting properties of various substances was found to be as follows:—

Cork.....	1
Red limestone.....	1.56
Mortar.....	1.62
Red brick made by hand.....	2.08
Yellow brick made by machinery.....	2.24
Red brick made by machinery.....	2.52
Travertine.....	3.31
Marble.....	3.39

Studies were also made for the purpose of determining the relation of building materials to microbes, it being observed that one of the properties of the materials employed in construction is that of absorbing and retaining disease germs and transmitting them to the interior of buildings. A very interesting observation made was the fact that lime and mortar never contain living germs, and that by incorporating with such mortar in the laboratory various cultures of germs, no trace of them could be found at the end of twenty-four hours or after eight days. Old walls, however, contain living germs, even in their centers, as was proved by Dr. Sanfelice, a colleague in the work from which these facts are drawn. Dr. Sanfelice perforated with very great care and precautions, a wall of the old hospital San Gallicano, at Rome. Great numbers of microbes were found in the very center of the walls. The experiments made show, however, that the microbes of the air pass through building materials only with very great difficulty. A

volume of air containing from 200 to 400 germs, was found, after having passed through a block of brick one and one fifth inches thick, to contain only two microbes, while a block of mortar of the same thickness removed all of the germs but a single one.

The question whether microbes may be made to penetrate building materials more easily when suspended in water, was also submitted to the test of experiment. It was found that when thus associated with water, microbes work their way into the interior of brick and other porous material with considerable facility. In one case, germs were found to have penetrated four inches into a brick after it had been in contact with the culture for six weeks. The bacillus *prodigiosus* penetrated a block of limestone to a depth of four inches in five weeks, without pressure, and more than half the same depth in the space of two weeks.

The ready permeability of limestone, brick, and other similar building material by germs, renders important the adoption of means to prevent the saturation of walls with germs from contaminated soils. The method employed for this purpose in Rome, which seems to commend itself as being eminently satisfactory, is the interposition below the foundation of the wall, of a layer of basalt or very dense stones coated with basalt.

The author draws the conclusion, from the various experiments which he has made, that the lateral walls of buildings should always be made impermeable to air, not only to prevent the penetration of the walls by microbes, but to allow of frequent washing without the saturation of the walls with moisture. The only objection which has been urged against the rendering of walls impermeable, is that of Trelat, who suggests that the porosity of walls should be maintained to allow the penetration of germs, by means of which a process of nitrification similar to that carried on in the soil may be set up. By this means, the organic matters absorbed by walls may be destroyed. Attention is also called to the fact that molds are more apt to adhere upon impermeable walls than upon porous walls, for the reason that porous walls absorb the moisture essential to the development of molds. Both these objections are without weight, however, when the fact is noted that impermeable walls would contain no organic matter to undergo nitrification, and hence would afford no opportunity for germs to perform a work of this kind, and the further fact that the walls of a room, as well as the furniture contained in it, may be kept free from mold by frequent wiping, by which means also they will be kept free from dust, germs, and other impurities.



IMPORTANT NEW DISCOVERIES RELATING TO DIGESTION.

A LENGTHY article appears in a recent number of the *Bacteriological World and Modern Medicine*, giving an extended account of the late remarkable discoveries of Profs. Hayem and Winter, of Paris, two eminent chemists and physiologists, in relation to the work performed by the stomach in the process of digestion. For several years these eminent physicians have been engaged in patient researches in relation to the character of the changes which take place in the food during the digestive process, and they have at last discovered a means by which the digestive process can be studied with a degree of accuracy which secures results hitherto unattained and unattainable. Their method of procedure is to give the patient in the morning, while the stomach is still entirely empty, neither foods nor fluids having been taken since rising, a test meal consisting of two ounces of bread and eight ounces of water. At the end of an hour, a small and very soft and flexible rubber tube is given to the patient, who, placing one end of the tube in the mouth, swallows it into the stomach. By this means a portion of the digesting food is removed from the stomach and submitted to careful chemical tests and minute analysis. The stomach is, as it were, surprised in the midst of its work, and thus the secrets of the digestive process are unlocked, and facts of the greatest value learned.

The new methods of chemical analysis employed by Hayem and Winter enable them to elucidate a number of important questions respecting the digestive process, which have been heretofore only guessed at, no means having previously existed by which accurate information could be obtained. The investigations which have been carried on by them have developed some very interesting facts in relation to the nature of the work done by the stomach in digestion, which may be briefly stated as follows:—

1. The stomach secretes hydrochloric acid and in pepsin. The hydrochloric acid when secreted, is combination with chloride of sodium and other bases.

2. Under the vital influence of the stomach activities, the chlorine is set free from the bases with which it is combined, and thus prepared to enter into the work of digestion.

3. By the aid of the pepsin the chlorine is made to combine with the albumen, converting it into peptone, which is absorbed and formed into blood to nourish the body.

It thus appears that there are two different kinds of work done by the stomach: First, the secretion of hydrochloric acid, or chlorine in combination with bases; and second, chemico-vital changes by which the hydrochloric acid is set free and then combined with albumen.

The data obtained by Hayem and Winter render it possible to study with accuracy both the quantity and the quality of the work which the stomach does in both the lines mentioned. Many variations are found possible:—

1. All branches of stomach work may be either increased or diminished.

2. There may be an abundance of chlorine secreted, but no actual digestive work done because the chlorine remains combined with the bases in the form in which it is thrown into the stomach by the gastric glands.

3. There may be a sufficient secretion of chlorine, and an abundance of chlorine set free from the bases with which it is combined, and yet no useful stomach work, for the reason that the chlorine fails to combine with the albumen, the first step in the process by which albumen is changed to peptone and prepared for absorption.

4. There may be too little secretion of chlorine.

5. It is even possible that there may be an abundance of hydrochloric acid secreted, the proper

amount of chlorine may be liberated, and there may be also the normal amount of combination of chlorine with albumen, and yet the quality of work done may be of such an inferior character that the individual will be in a state not far removed from one of actual starvation. It is this class of patients who frequently remark to their physicians, "Doctor, my appetite is insatiable; I could eat all the time and never be satisfied; my food seems to do me no good; I cannot gain an ounce of flesh, although I eat prodigiously, and I am growing thinner all the time." Such patients are frequently met with, and their cases are often very puzzling, even to physicians.

No class of diseases has given physicians more annoyance than dyspepsia. The cause of the great perplexity in the treatment of this large class of disorders has been the fact that cases presenting identical symptoms are often not relieved by similar methods of treatment, a fact which has led to no little disappointment on the part of both patients and physicians. A remedy which gives most satisfactory results in a single case, or even in a series of cases, proves to be equally unsatisfactory in another case apparently identical, and perhaps gives only a succession of dismal failures in cases to which it seems to be exactly adapted. The methods of studying the gastric fluid devised by Profs. Hayem and Winter, fortunately offer a means of relief from this perpetual uncertainty, and have opened the way for the rational treatment of a vast number of cases which have heretofore been subjected, for the most part unavoidably, to a blind and most disappointing empiricism.

The writer became acquainted with the methods referred to, by notices in the Paris journals of the work of these eminent physicians, and secured, as soon as published, the little volume giving a full description of their methods, entitled "*Chimisme Stomacal*." After some months' careful study of the subject, and trial of the methods described, they have been put in full operation in the Laboratory of Hygiene connected with the Sanitarium, at Battle Creek, Mich., and most interesting practical results are every day realized by their employment. Several hundred analyses have been made, and the light which they throw on the cases investigated, has been such as could not have been obtained from any other source.

This is not the proper place for a publication of technical details nor histories of cases, but it is important that it should be known that a wonderful advance has been made in rational medicine; that another vast domain of disease, which has heretofore been almost wholly unexplored, in consequence of

the lack of precise and accurate means of investigation, has been conquered by science, and that the well-trained physician has now placed in his hands a means by which he can, if he chooses, bring out from their obscurity a vast number of cases which have hitherto been exasperatingly puzzling and baffling, even to the wisest and most experienced of medical men.

It is also interesting to note that the results of these recent investigations bring into strong light the value of hygienic methods in the treatment of digestive disorders. Diet and regimen are found to be of vastly greater value than medicinal agents of any sort, although medicinal agents of an appropriate character are by no means of small value in the management of a certain class of cases. Elaborate investigations, especially with reference to the causes and best means of cure of digestive disorders, are in progress in the Laboratory of Hygiene connected with the Sanitarium, and the results, which are already interesting, will be made public in due time.

Not the least interesting feature of the new method of studying disorders of the stomach is the fact that the precise data obtained by the methods employed, render it possible to place upon a mathematical basis and express in formulæ by the aid of symbols, every kind and degree of disturbance in the normal digestive process. This portion of the subject is quite too technical for these columns, as it would be unintelligible to any but a thoroughly educated physician, but we may perhaps venture to introduce one or two points by way of illustration. The data obtained by analysis, and the symbols used to represent the various quantities determined by analysis, are as follows:—

1. The total acidity, represented by A.
2. The total amount of chlorine secreted by the stomach, represented by T.
3. The amount of free hydrochloric acid present in a given stomach fluid, represented by H.
4. The amount of chlorine combined with albumen, or combined chlorine, which indicates the useful work done by the stomach, represented by C.

As secreted, the chlorine has no acid properties, being combined with bases. When set free in the form of hydrochloric acid or combined with albumen, values which are represented by H and C, it exhibits strongly acid properties.

The total acidity of the gastric juice is practically the result of the combined values of H and C; in other words, $H+C=A$. From this formula we derive, by simple algebraic methods, $A-H=C$, and also $\frac{A-H}{C}=1$. Having obtained by analysis the

quantities which are represented by A, H, and C, and substituting these quantities for the symbols in the last formula, it is sometimes found that the result obtained is more than 1, and sometimes less than 1. It is evident that if the result obtained exceeds 1, it is because the total acidity, A, contains acid substances which are not furnished by H or C. These acids are the result of acid fermentation, consequently this formula furnishes a means of not only determining the presence but also the amount of acid fermentation, which cannot be determined by any other known means. Another formula will illustrate this: Representing the acids of fermentation by X, the formula for a case in which acid fermentation was known to be present, would be $A=H+C+X$, from which we have $A-H=C+X$, and $\frac{A-H}{C}=1+\frac{X}{C}$.

We have found the value of $1+\frac{X}{C}$ in some cases to be as high as 6, which indicates that the amount of acidity due to acid fermentation is six times the normal element represented by C. The value of this fact will be estimated when it is realized that the methods of treatment necessary for the relief of excessive acidity of the stomach due to acid fermentation, and that due to an excessive secretion or liberation of hydrochloric acid, are precisely opposite in character. The value of the method referred to in this article will also be appreciated when it is understood that it is the only means heretofore afforded by science for the determination of this important question.

Another fact of almost equal consequence is furnished by this simple formula. If the working out of the formula, after substituting for the symbols the figures obtained by the analysis, gives a result less than 1, or to be exact, less than .86, which has been determined by observations upon healthy individuals, it is clear that the value of C, expressed by the figures, and which should represent the useful stomach work, is really a fictitious one; in other words, C is at a discount and not worth its face value. This has been found to be the result of the formation of abnormal products in the stomach, which, although affording the usual amount of chlorine and hence giving a normal value to C, as determined by analysis, were of no use in nutrition. It is not an uncommon thing to find the value of $\frac{A-H}{C}$ to be nothing, instead of 1, which means that the stomach, although perhaps doing as much work as a healthy stomach ought to do, is doing no useful work at all, the products of digestion being utterly devoid of value. This sort of patients eat abundantly, and yet are starved.

Normal digestion is represented in the new method by the following formula: $A=, a=, T=, C= \left\{ \begin{array}{l} H= \\ \\ \\ \end{array} \right. =$. A case of excessive stomach work, or hyperpepsia, is expressed by the formula, $A + a + T + C + \left\{ \begin{array}{l} H + \\ \\ \\ \end{array} \right. +$. In a case in which there is too little stomach work, or hypopepsia, the formula is $A -, a -, T -, C -, \left\{ \begin{array}{l} H - \\ \\ \\ \end{array} \right. -$.

These different formulæ combine themselves in a great variety of ways in the expression of the various modifications of the digestive process met with in disease.

This subject, which may be called the algebra of the stomach, when thoroughly mastered, renders the study and treatment of cases of dyspepsia—heretofore rather a dull and uninteresting subject to the physician, as well as a tedious and distressing one to the patient—a most interesting and even fascinating line of investigation. New combinations and varieties of deviation from the normal type are constantly met with, and peculiar and unexpected results are brought to light by the mathematical calculations and the working out of formulæ in each individual case.

HOT WATER FOR HEADACHE.—Hot water is a sovereign remedy for certain forms of headache. It is especially useful for relieving occipital headaches. A hot foot bath accompanied by a hot sponge of the upper part of the spine, or, in many cases, simply the application of heat in the form of a hot bag or a fomentation to the upper spine is a most excellent remedy for this form of headache.

MINERAL FOODS.—Great quantities of stuff are consumed annually with the idea that concentrated bone or brain-making matter is being swallowed in the shape of some mineral substance which is supposed to be able to furnish exactly the constituents needed by soft bones or weak brains. This practice is founded upon the fallacious notion that the body possesses the power to convert mineral substances into brain, bone, and other tissues, which is in direct contradiction of the best known facts of physiology. Vegetables possess the power to organize or vitalize inorganic matter. Animals possess only the power to appropriate and transform the matter organized by the vegetables, eaten either at first hand in form of vegetables, or at second hand in the form of flesh food, into the constituents of their own bodies.

Experiments have shown that those substances taken as bone or brain food are in great part not absorbed at all; certain it is that they never find their way where they are expected to go.

ANSWERS TO CORRESPONDENTS.

INTERCOSTAL NEURALGIA.—T. C. B., Penn., inquires, "What is the best home treatment for intercostal neuralgia?" It affects the muscles of his left side and back. He is a great sufferer from dyspepsia.

Ans.—Intercostal neuralgia, the most common cause of pain in the chest, which is not infrequently wrongly attributed to disease of the lungs, is generally associated with digestive disorders of some sort, and particularly in those forms in which there is pain and tenderness at the epigastrium or pit of the stomach, or in the region of the umbilicus. Temporary relief may be easily obtained by means of fomentations, mustard compresses, and applications of electricity; but permanent relief is obtained only by the removal of the digestive disorders to which the disease is due. Examination of the painful region will show tender points between the lungs near the sternum, or beneath the arms and near the spine, showing the location of the diseased nerves. The tenderness is the result of an irritation of the stomach, communicated to the sympathetic nerves of the abdomen and thence transmitted to the spinal cord and the nerve branches arising from it. In many cases where intercostal neuralgia is the most common symptom, there is a form of dyspepsia known as hyperæsthesia, in which there is an excessive secretion of stomach juice. In such cases, however, there is excessive acidity of the fluids of the stomach, due to the acidity resulting from fermentation of the food. Whatever the condition is, it must be determined by a careful examination, and removed by careful treatment.

ULCERATION OF THE WOMB.—Mrs. A. S., Ind., has been troubled with the above-mentioned disease for about eight years. Has been using "Lillium Specific," which gives only a temporary relief. Would like to know what she should use in place of this compound.

Ans.—The use of nostrums and patent medicines of various sorts for the relief of the diseases peculiar to women, and especially the use of the various compounds which have been sold within the last few years under the various names of "Lillium Specific," "Olive Branch," "Orange Blossom," etc., cannot be too strongly condemned. None of these nostrums are capable of accomplishing what is claimed for them by their manufacturers, and all of them which we have submitted to an examination have been possessed of properties of a most dangerous character. We have met a number of cases in which great

mischief had been done because of their use. We are glad our correspondent has decided to abandon the use of this dangerous class of remedies. The transient relief gained by their use is only the result of the narcotizing effect of the opiates which they almost invariably contain.

CHEST WEIGHTS.—"Alfonso," Penn., asks our opinion in relation to chest weights, and whether any particular make or variety can be recommended.

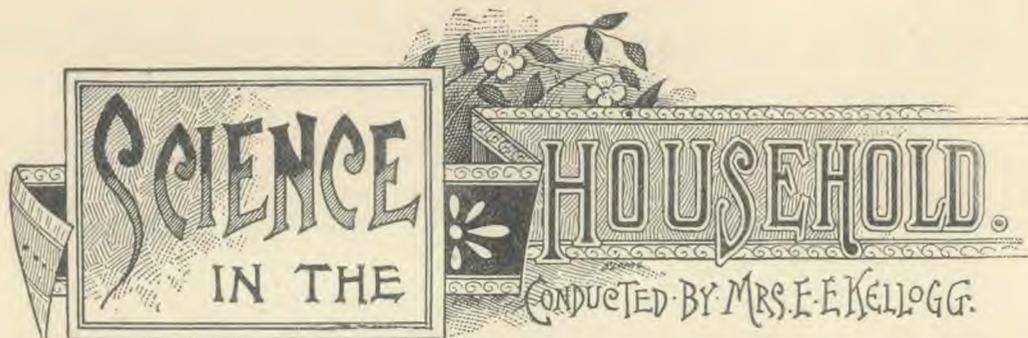
Ans.—Chest weights are of great value as a means of strengthening the muscles of the arms and chest. Excellent machines are made by the Narraganset Machine Co., Providence, R. I., and also by the Shoemaker Co., Akron, Ohio.

SPONGING THE SPINE, ETC.—W. W. Mc C., N. Y., asks: "1. What is the physiological effect of sponging the upper part of the spine with hot or cold water? 2. Is it safe for a nervous person to sponge with hot or cold water every night before retiring? 3. What is the price of the hygienic manual by Dr. Kellogg, advertised in GOOD HEALTH?"

Ans.—1. Sponging the spine with hot water stimulates the vaso-motor muscles to which the nerves derived from that portion of the spine are distributed. Sponging the spine with cold water has an opposite effect. A cold bag at the spine is one of the best means of warming the extremities. 2. Yes. 3. The price of the "Home Hand-Book of Domestic Hygiene and Rational Medicine" in Library binding, is \$7.50.

SACCHARINE — DIABETES.—Mrs. P. S. R., Mass., asks the following questions: "1. Do you consider saccharine, or sugar made from coal tar, poisonous? 2. What is good for diabetes?"

Ans.—1. Saccharine is not sugar; it is a drug manufactured from coal tar, which has a sweet taste, but has no greater resemblance to sugar in other respects than has sand, which has no taste or flavor whatever. It is a poisonous substance, although not seriously dangerous in small doses. It should never be used, however, as a substitute for sugar, as when in long use it is likely to do mischief. The French government has found it necessary to prohibit its use in sweetening canned fruits as a substitute for sugar, and in other ways as a substitute for sugar. 2. The essential remedies for diabetes are diet and exercise; the diet free from sugar and starch, and exercise rigid.



SOME COMMON TABLE UTENSILS.

WE make the following abstract from *La Science en Famille* :—

The spoon is undoubtedly of very ancient origin, for, although it is always possible to eat solid food with the fingers,—a very ancient and very natural practice,—yet the presence of liquids or semi-solid foods would naturally have suggested, we must think, to the veriest barbarian, some utensil of a convenient, concave shape for their transmission to the mouth. The famous Lacedemonian “black broth,” for example, a record of whose virtues has come down to us from early history, could not possibly have been consumed otherwise than with some sort of spoon. In confirmation, we are told that in so remote a period as in the seventeenth century before the Christian era, spoons were used for mixing certain powders with beverages. These spoons, of which quite a large number are in existence, were remarkable for their generally fine and very rich ornamentation. The Museum of the Louvre possesses several of them. Later, spoons were discovered in great number and variety at Pompeii, as well as in other excavations, and many notable specimens were preserved in the famous treasury at Hildesheim, Prussia. The use of spoons in France was not generally adopted until toward the end of the fourteenth century.

The use of the knife dates a long way back into the shades of antiquity, and the first of which there is any account were of stone. Herodotus tells us that the knives used by Egyptian surgeons in his time, were of stone. The use of the knife as a table utensil is, however, of comparatively recent date. French records give an account of a famous cutlery works at Beauvais, France, in the tenth century, but even then it does not appear that knives were much used at table. In the style of knife manufactured at this epoch, as well as that in general use for a long time afterward, the blade was fixed and inclosed in a

sheath. The ordinary pocket knife has been known for less than two centuries, during nearly one of which, tables were not provided with them, but each person carried his own. This custom prevails even now to some extent with elderly foreigners of the poorer class, whom we occasionally notice even in this country taking their knife from their pocket and using it skillfully during the course of the meal. These examples tend to show the rarity of the knife, to within a short period, upon the tables of persons belonging to the lower classes.

The fork, such an absolute necessity of our present civilization, was entirely unknown to the Greeks and Romans, who, in taking their solid food, used their fingers, which they washed in basins. Meats were served cut in pieces of varying size, and each one divided the piece that he had before him as best he could with his fingers.

In the Middle Ages, the fork appeared only as a curiosity, and was rarely used. It was, at most, employed for eating fruit or slices of bread and cheese.

We find a few forks figuring in the treasury of John II, Duke of Burgundy; and Galveston, a favorite of Edward II, of England, owned, says a historian of the time, “sixty-nine silver spoons and three forks for eating pears with.” A century later, we find, here and there, numerous traces of the existence of forks, but still they were never used as we use them, for eating solid foods, meats, vegetables, etc., at table. At this epoch they had but two tines, and it is from that circumstance that is derived the name of *fork*. Indeed, forks having more than two tines are a matter of only the last half century. Our grandfathers and grandmothers used the little two-tined forks, in tranquil content, without thought that there could be anything more convenient for the purpose.

Henry III was the first to use forks upon the table. He had a certain number of silver ones made,

and the use of the articles spread very quickly at court. It must be added that such use was regarded as quite ridiculous by the public, as may be seen from the following passage from a satire upon the court of Henry III: "Firstly, they never touched meat with their hands, but with forks, and they carried it to their mouth in bending forward the neck and body upon their seat. They took salad with

forks, for it is forbidden in that country to touch meat with the hands, however difficult it may be to take, and they prefer that this little forked instrument, rather than their fingers, shall touch their mouth."

But the convenient little fork held its own amid all the adverse criticism of the time, and even made hosts of friends, finally winning its way into universal favor and esteem.

CONTRIBUTED RECIPES.

GRAHAM GRAVY TOAST.—Moisten slices of well-prepared zwieback slightly with salted boiling water, and serve with a dressing made by thickening one pint of milk with one and one fourth or one and one half tablespoonfuls of Graham flour.

VEGETABLE PEA SOUP.—Cook a pint of split peas slowly until thoroughly disintegrated. When the peas are nearly done, put to cooking one and one half pints of sliced potato and one medium-sized onion sliced thin. When done, rub all through a colander, add boiling water to make of the consistency of thin cream, season with salt if desired, and serve.

GRITS MUSH BREAD.—Prepare a mush by cooking one third of a cup of Graham grits in two cups of boiling water for three hours. To one cup of this

mush, while still hot, add one quart of milk or water. Let it cool till lukewarm, then add one fourth of a cake of compressed yeast dissolved in a tablespoonful of warm water, and enough white flour to make a thin batter and set to rise. When well risen add Graham and white flour in the proportion of two thirds Graham to one third white, sufficient to knead. Let the whole rise again in a mass, knead again, shape into loaves, and place in baking tins. Allow it to rise again and bake.

LENTIL HASH.—Take equal quantities of mashed brown lentils and cold Graham gem crumbs, mix well together, salt to taste, and heat in a stewpan the bottom of which is covered with boiling water. Thin cream may be used instead of the water if preferred.

EVORA BUCKNUM.

SOME CO-OPERATIVE COOKING CLUBS.—The *Woman's Column*, Boston, gives some interesting facts concerning several co-operative cooking clubs, each of which has been in operation a year or more. One known as the "Bellamy Club," at Junction City, Kan., has forty-four members, each member of course representing a family. During the year \$5320 has been expended for table supplies. The members supervise the work by turns, without pay. A professional cook is hired, and the proposed food is delivered at the various residences at a stipulated time. The expense is estimated to be fully one third less than in separate kitchens.

One in Utica, N. Y., begun two years ago with twenty-two members. In six months the membership reached sixty, which was the limit of accommodation. The cost is about \$3 per week, each.

Persons bringing a visitor pay twenty-five cents per meal, and give notice in advance. The cook and servants live in the club-house and are custodians of the kitchen outfit.

THE TRUE DEFINITION OF "MENIAL."—A late writer in the *Christian Union* thinks that "the dictionary makers have a good deal to answer for in giving 'domestic servants' as one of the definitions of 'menial'!" She goes on to say:—

"The resemblance between the sounds of mean and menial is so strong that the conclusion is almost irresistible to the uneducated that menial service is a mean thing; hence, domestic service, being menial, must be mean; of course, only a mean person can do mean things; we are not mean, therefore can do nothing menial—a conclusion which puts domestic service out of the question. Yet the two words not only have nothing in common, but are even derived from different languages,—*mean*, in the sense of vulgar and base, coming from the Anglo-Saxon; and *menial*, through the Norman-French adjective *meignal*, from the noun *mesnie*, 'family, household, or company,'—and have not in their original significance any closer relation than this, which is none at all."

LITERARY NOTICES.

THE *Pansy* for September contains its usual number of short stories, all up to the regular high standard. Its leading stories by "Pansy" herself (Mrs. G. R. Alden), and "Margaret Sidney" (Mrs. D. Lothrop), move along in that interesting fashion their authors best know how to adopt, promising a satisfactory ending. A paper on Robert Burns contains much by way of valuable hint and suggestion, and will be read with interest by all classes of readers. There are poems, shorter articles, and verse, with the popular P. S. Christian Endeavor Corner, so highly prized by young and old alike. Price \$1 a year; 10 cents a number. D. Lothrop Co., Publishers, Boston.

THE Jenness-Miller Co., 114 Fifth Avenue, New York, announce a new work from Mrs. Annie Jenness-Miller, "Mother and Babe," as now ready. In this manual Mrs. Miller endeavors to cover all the practical points as to dress, diet, exercise, etc., as well as general preparation for safe and natural motherhood. Patterns and diagrams for mother's adjustable dress, and for baby's wardrobe accompany the work, the manual having a pocket inside each cover, containing the patterns. In ordering, the bust measure of the mother should be given. Price, cloth, \$2.

"WHY Young men Defer Marriage" is the subject of an interesting article in the September *Ladies' Home Journal*. The domestic problem concerning the relations existing "Between Mistress and Maid," is intelligently discussed by Harriet Prescott Spofford, Mrs. Lyman Abbott, Helen S. Conant, and Christine Terhune Herrick. A carefully prepared paper by Isabella M. Aitken upon "The Care of the Hands" will be found valuable to women, as will Miss Parloa's "All About the House." The Rev. T. De Witt Talmage writes of "Art in the Old World," and Mrs. Lyman Abbott discusses many topics intelligently and well. Robert J. Burdette writes refreshingly of "Home, Sweet Home," and Mrs. Mallon gives some "Hints to Elderly Women." The Curtis Publishing Company, Philadelphia.

THE "NEW INDEXED ATLAS OF THE WORLD," Rand, McNally & Co., Chicago, publishers, is without doubt the finest and most complete Atlas ever published. It is a hand-book of information on a thousand topics, a reference work on all geographical subjects, a digest of the laws of nations, and a popular educator for the people. The Atlas com-

plete is 15 x 21 inches in size, and contains 581 pages—182 pages of maps, 66 of which are double pages 15 x 21 inches. It has a large-scale map of every country and civil division on the face of the globe, newly engraved, and which shows every city, town, village, and hamlet, every lake, river, and mountain on the face of the globe. These maps also show every railway in every country, every county, province, or other political division, beautifully colored.

THE August number of *Good Housekeeping* is worthy of a careful inspection by every manager of a household, since it aims at all seasons of the year to aid in those duties which are indispensable, without reference to season or temperature,—to make the home bright and interesting. There is in this issue, perhaps, less than usual of the merely technical and routine, with more of that which pertains to the general life; but the various departments will be found well balanced and interesting. Clark W. Bryan & Co., Publishers, Springfield, Mass.

THE third installment of the argument in behalf of Lord Bacon as the author of the Shakespeare plays, is presented in the September number of the *Arena*. Various objections to this theory of the authorship are here formally stated and replied to, certainly in a manner to attract the attention of readers. The discussion grows in interest as it proceeds. The September *Arena* also contains brilliant papers by Ibn Ishak, Rev. M. J. Savage, James A. Herne, Hamlin Garland, Congressman John Davis, Prof. Willis Boughton, and other representative essayists, together with a powerful symposium on Women's Dress Reform, prepared under the auspices of the National Council of Women of the United States. *Arena* Publishing Co., Boston.

THE September number of the *Jenness-Miller Illustrated Monthly* is quite up to its usual standard of excellence. Mrs. Jenness-Miller has an instructive article on "How to Become a Picture in Your Clothes." There are sketches and portraits of two famous foreigners, the Empress of Germany and Jean Ingelow. Mabel Jenness writes of "Art in Repose and Motion;" Mrs. M. E. W. Sherwood tells of "Social Difficulties and Successes;" Prof. Henry Drummond discusses books, and a dozen other well-known writers have timely and instructive articles. \$1 per year. Jenness-Miller Co., 114 Fifth Avenue, New York.

PUBLISHERS' DEPARTMENT.

ANOTHER SANITARIUM PICNIC AT LAKE GOGUAC.—At the August Sanitarium picnic at Lake Villa on Goguac, a little program of music and before-dinner speeches was carried out. In the absence of Chaplain Mc Coy, Rev. Lewis Brown, of St. Luke's Church, Cincinnati, acted as master of ceremonies in a most felicitous manner. In his introductory remarks he said that some bright thinker had divided the world into four classes: sick, half-sick, well, and half-well. In the most healthful communities, the number of those who can boast of being really well are few compared with those who are sick and half-sick; thus the aristocracy of disease is largely in the ascendancy. This being the case, the man who is trying to circumscribe disease and lessen pain, is deserving of our warmest praise and our hearty cooperation, and Dr. Kellogg is pre-eminently such a man. The earnest minded and thoughtful, and these constitute the great majority of his patrons, accord to him and his co-workers hearty sympathy and support, and recognize the unselfishness and nobility of their endeavor. The Christ spirit seems to pervade every department of the work from lowest to highest.

Hon. S. B. Minshall, a lawyer from Chicago, followed in a very happy vein. He said that the people here were in search of happiness, and that the most successful way to find it was to obtain health. He congratulated them as health-seekers, on their selection of a place, the Sanitarium being admirably adapted to the recovery of the lost jewel. One might liken his time here to a day, using the term metaphorically—a day which began in doubt and gloom through the influence of disease, and which ended in glorious sunshine through the influence of the cure.

Messrs. Rice and Atkins and Misses Wild, Cook, and Anthony furnished some fine music.

A shower cut short the outdoor festivities, but that only gave

excuse for building a glowing wood fire in a grate in the parlor, a luxury which was not on the program.

* *
* *

DR. T. A. BLAND, of Washington, D. C., who is well known for his benevolent work among the Indians for the past fifteen years, delivered a very interesting lecture one evening recently in the Sanitarium on "The American Indian—What Shall We Do with Him?" The true solution of the Indian problem, as Dr. Bland views it, lies in providing the Indians with schools and an industrial education. They have abundance of land and are better suited to agriculture than any other pursuit, and that they can be taught to carry on such occupations successfully was demonstrated years ago on the reservations of the Five Nations. There, the Indians have homes and churches of their own, not a pauper being found among them, or a person of school age or above it who cannot read and write; and they not only support their own ministers and teachers, but they do a great deal for foreign and home missions. Dr. Bland is secretary of the National Indian Defense Association and the author of a number of humanitarian books and leaflets.

* *
* *

MISSION WORK IN RUSSIA.—Elder L. R. Conradi, of Hamburg, Germany, lately gave a missionary address in the Sanitarium. He has traveled quite extensively in Russia, and among his varied experiences, has had a taste of prison life, and would probably have been sent to Siberia but for the influence of the American Consul. His offense was preaching the gospel, the same that sends many a noble man and woman to justly dreaded exile. One is free to hold what religious views he chooses in Russia, provided he does not attempt to promulgate them. Hence,



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missionaries labor under the greatest disadvantages and to their imminent peril. The places chosen for worship and the manner of conducting meetings, remind one of the early church and its martyrdoms. Yet in spite of all hindrances, there is a spirit of great religious awakening throughout all Russia. The people are hungering for the word of life, and the Bible is diligently studied.

* * *

TO OUR SUBSCRIBERS.—We have formerly been in the habit of cutting off our subscription list those of our subscribers who did not promptly renew their subscription to this journal when their time had expired, but as an experiment, we have recently adopted the plan of sending GOOD HEALTH along for a few months over time, believing, from the constant good words which are spoken of it on every side, that the journal has become too much of a household necessity in most cases, to be given up, and for that reason a renewal will be sent us sooner or later; thus our subscribers will be spared the vexatious loss or delay of one or more numbers, and the office will be saved the trouble of cutting off and also of re-entering such names. In view of this we would ask our subscribers, each and all, kindly to examine the date upon their GOOD HEALTH address label, and ascertain whether their subscription has expired, and if so, write us, sending a renewal.

* * *

TO THE WOMEN POETS OF MICHIGAN.—It has been wisely suggested by the esteemed member of the Board of World's Fair Managers for Michigan, Mrs. Julia Augusta Pond, that all the women poets of Michigan be represented at the World's Fair, and accordingly, the management and direction of a plan to that

effect has been intrusted to the undersigned. It is now necessary to establish correspondence with every woman poet in the State, whose productions have been published heretofore in newspapers or magazines only, as the plan is intended for those who cannot contribute a book of their own poems. All such are requested to address at once, for further information, etc., Bessie Binns, 51 East Adams Avenue, Detroit, Mich.

* * *

THE field of Gettysburg is to the old soldier and the student the most interesting of all the earth's battle grounds. Those who go to Washington to attend the encampment of the G. A. R. in September, will have the best opportunity of visiting Gettysburg by taking the line of the Michigan Central and the Northern Central, which includes a side trip to Gettysburg either going or returning. For those who wish to return by way of Philadelphia, all return tickets will be honored either via the short line or via Philadelphia, allowing stop-over at Baltimore, Philadelphia, and Harrisburg. The stop at Philadelphia will permit of a side trip to New York and return, at the low rate of \$4.

During the summer season the Michigan Central gives the privilege of stopping over at Niagara Falls at any time within the life of the ticket returning, upon depositing it with the ticket agent there, affording a valuable opportunity to see the beauties of the great cataract and vicinity at leisure.

Tickets are also sold to Washington via Toledo and the lines south and east therefrom.

The Michigan Central is the shortest route, the best route, and offers inducements that no other line can give. For any additional information, apply to nearest Michigan Central ticket agent or to J. S. Hall, Mich. Pass. Agent, Jackson, Mich.



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THE sale of books by canvassing agents, looked upon a few years ago as a sort of peddling business, has almost reached the dignity of a profession, and at the present time quite a considerable portion of the reading public depend upon the traveling salesman for their supplies of recent choice literature. No publishing house thinks of presenting its most valuable works to the public in any other way. **There is no more pleasant, no more useful, and no more profitable business** in which a young man or woman of ability can engage, and **none which brings such large and quick returns** to the energetic worker, as the sale of a good book in good territory, prosecuted by a good agent employing good methods, and putting energy, enterprise, and industry into his work.

The man or woman who engages in the introduction of a good book, — one calculated to instruct, elevate, and materially benefit all who become acquainted with its contents, — is as genuine a missionary as the man or woman who engages in missionary work in the wilds of Africa or the distant islands of the sea.

The good book as well as the good impression which a good agent leaves behind him in each of his successful efforts, is a permanent source of salutary influence to the household which receives it.

The undersigned have for many years been engaged in the publication of books for the million, and several hundred thousand copies of their bound volumes are to be found scattered among the households of the United States and other English-speaking countries, although comparatively little effort has been made to push the sale of their publications. They are now organizing a vigorous campaign for the introduction of their various works in all parts of the United States, Canada, and the West Indies. **Liberal commissions are offered agents, splendid territory, and books, the selling qualities of which are not excelled by any subscription books offered by any publishing house in the world,** as will be seen by the following reports of work done within the last few weeks in different parts of the United States: —

John P. Neff, a college student less than twenty-one years of age, now at work in a Western State to earn money to pay his expenses during the next college year, has sold of the two works advertised on this page, books to the following amounts, for seven successive weeks consecutively: —

First week (4½ days)	\$235	
Second week.....	\$311	Fifth week.....\$400
Third “	350	Sixth “ .. 440
Fourth “	375	Seventh “ .. 245

This same agent sold \$180 worth of books in one day.

Another agent (C. C. Nicola) sold 65 books in one week; amount of sales, nearly \$300.

F. A. Shaver, an agent working in Wisconsin, took orders for over 200 books, and delivered nearly all of them, in three weeks.

Another agent working in Vermont, when able to put in full time, has averaged nearly \$100 per week.

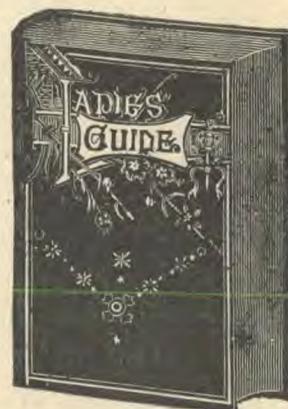
A young lady made 25 canvasses in one day and took 21 orders, amounting to \$95.

Another young man took orders amounting to \$458 in 57 hours. **In one day of 12 hours he sold 36 copies** of “Man the Masterpiece” and “Ladies’ Guide,” **netting a profit of \$99** at usual commission.

Scores of cases might be cited in which agents are making from \$25 to \$50 clear, weekly. No agent of average ability in average territory can fail to succeed with these works, and many who have failed with other works succeed with these. A wide-awake agent with plenty of pluck and perseverance is certain to make a success almost from the start, when he has had a proper preparation for the work.

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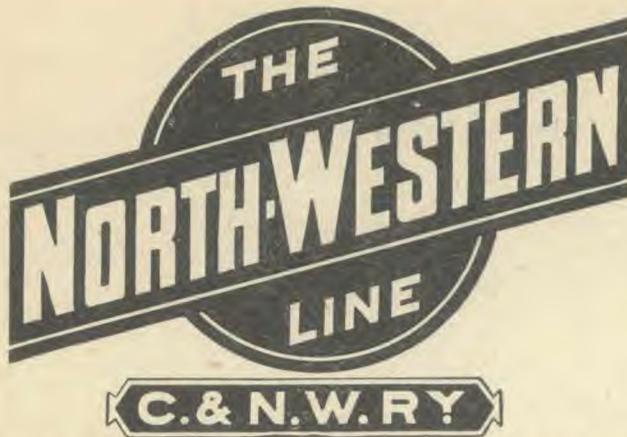
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STATIONS.							
Chicago.....	am 9.00	pm 12.20	pm 3.10	pm 5.02	pm 9.20		pm 10.10
Michigan City.....	11.05	2.05	4.56	6.45	11.13		am 12.25
Niles.....	pm 12.35	2.57	5.48	7.38	am 12.25		1.45
Kalamazoo.....	2.05	4.00	7.04	9.00	1.57	am 7.10	3.37
Battle Creek.....	2.45	4.30	7.37	9.29	2.35	7.45	4.25
Jackson.....	4.30	5.38	8.52	10.42	4.05	9.45	6.25
Ann Arbor.....	5.25	6.27	9.45	11.27	5.38	10.47	7.47
Detroit.....	6.45	7.25	10.45	am 12.30	7.10	11.55	9.20
Buffalo.....	am 3.00	am 6.25	7.35		pm 7.55	pm 5.00	
Rochester.....	5.50	9.55					
Syracuse.....	8.00	pm 12.15					
New York.....	pm 3.45	8.50					
Boston.....	5.05	11.05	pm 6.15				
WEST.	† Mail.	† Day Express.	*N. Shore Limited.	*Chicago Express.	†Kal. Accom'n	*Pacific Express.	*Chic. Special.
STATIONS.							
Boston.....		am 8.30	pm 2.00	pm 3.00		pm 5.45	
New York.....		10.30	4.30	6.00		9.15	am 8.30
Syracuse.....		pm 7.30	11.35	am 2.10		am 7.20	
Rochester.....		9.55	am 1.25	4.20		9.55	
Buffalo.....		11.00	2.20	5.50	am 8.45	11.50	pm 7.45
Detroit.....	am 8.20	am 7.40	9.05	pm 1.20	pm 4.45	pm 9.00	am 2.15
Ann Arbor.....	9.57	8.39	9.59	2.19	5.50	10.27	3.07
Jackson.....	11.30	9.40	10.58	3.17	7.15	am 12.01	4.00
Battle Creek.....	pm 1.05	10.45	pm 12.02	4.30	8.47	1.20	4.50
Kalamazoo.....	2.05	11.30	12.19	5.05	9.45	2.18	5.35
Niles.....	4.00	pm 12.35	1.48	6.17		4.15	7.00
Michigan City.....	5.20	1.55	2.45	7.20		5.35	8.13
Chicago.....	7.35	3.35	4.30	9.00		7.55	9.55

*Daily. †Daily except Sunday. †Except Saturday.
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Night Express goes West at 12.05 a. m. daily except Monday.
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Chicago & Grand Trunk R. R.

Time Table, in Effect June 26, 1892.

GOING WEST.				STATIONS.		GOING EAST.			
pm	pm	am	pm			am	pm	am	pm
7.15	3.00	1.00	7.00	.....	Boston.....	am	pm	am	pm
9.45	5.00	6.30	8.00	.....	New York.....	9.55	7.40	9.25	.....
12.10	6.20	6.25	1.00	.....	Buffalo.....	8.40	5.50	4.20	.....
1.35	7.45	8.00	2.45	.....	Niagara Falls.....	7.30	4.10	3.10	.....
8.30	.....	8.00	12.00	.....	Boston.....	8.05	9.50	.....	.....
9.30	8.40	.....	.....	.....	Montreal.....	8.00	7.00	.....	.....
11.30	.....	1.00	.....	.....	Toronto.....	8.35	5.25	.....	.....
.....	.....	8.00	.....	.....	Detroit.....	9.25	7.45	9.25	.....
Day Exp.	B. C. Pass.	Lmtl Exp.	Passto Exp.	Mail Exp.	Dep.	Arr.	Mail.	Lmtl Exp.	Day Exp.
.....	.....	.....	.....	.....	Port Huron.....	10.01	.....	.....	12.10
6.50	3.49	12.22	8.40	.....	Port Huron Tunnel.....	9.56	12.35	7.30	8.50
8.05	5.10	1.27	10.07	.....	Lapeer.....	8.15	11.20	6.15	7.35
8.35	5.47	1.55	10.47	.....	Flint.....	5.40	7.05	10.05	.....
7.15	4.40	.....	8.25	.....	Detroit.....	9.25	7.45	9.25	11.50
7.50	5.17	.....	9.00	.....	Bay City.....	8.37	7.15	8.37	11.30
9.05	6.50	2.22	11.20	.....	Saginaw.....	8.00	6.40	8.00	10.43
10.02	7.55	3.07	12.20	.....	Durand.....	6.50	7.20	5.03	6.35
10.29	8.30	3.34	12.52	.....	Lansing.....	5.10	4.30	4.00	5.40
11.15	9.25	4.15	1.50	.....	Charlotte.....	4.34	9.01	8.25	5.11
11.53	pm	.....	2.35	.....	BATTLE CREEK.....	3.40	8.20	2.40	4.30
.....	.....	.....	1.08	.....	Vicksburg.....	2.33	7.40	1.48	.....
.....	.....	.....	1.19	.....	Schoolcraft.....	2.21	.....	.....	.....
12.40	.....	5.45	3.30	.....	Cassopolis.....	1.29	6.58	12.45	3.07
1.20	.....	6.20	4.10	.....	South Bend.....	12.45	6.20	12.00	2.35
2.45	.....	7.55	5.45	.....	Valparaiso.....	11.10	5.00	10.30	1.20
4.50	9.30	8.00	Chicago.....	8.40	3.00	8.15	11.25
pm	pm	am	pm Arr.	Dep.	am	pm	pm

Where no time is given, train does not stop.
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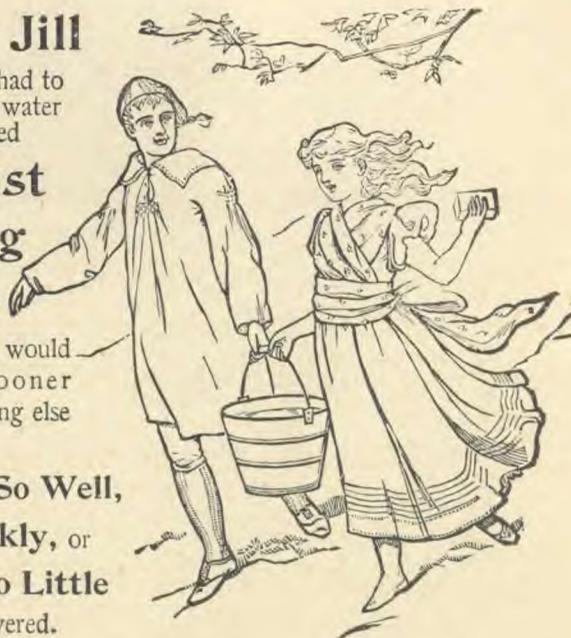
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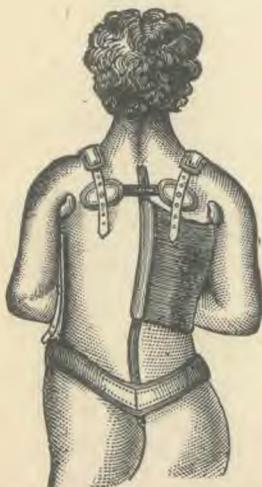
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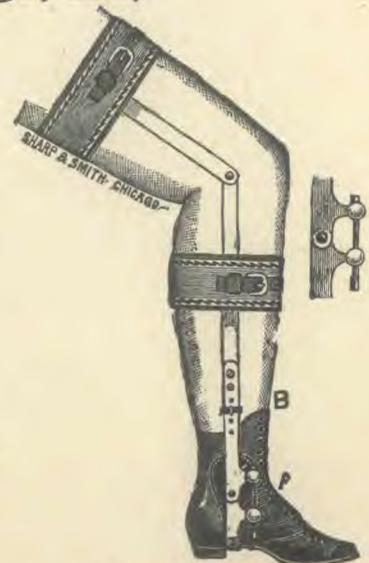
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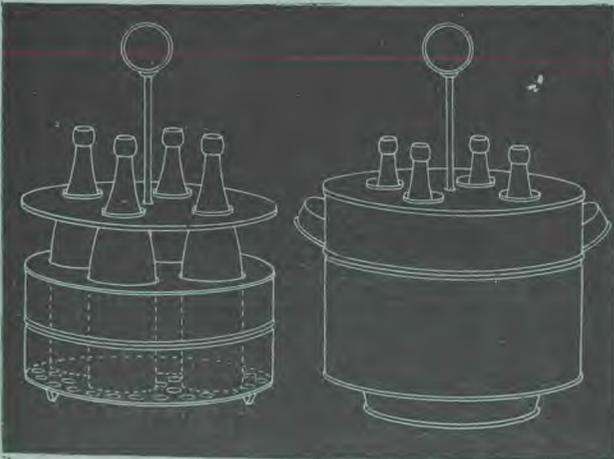
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