

The digestive ferments and their uses in medicine and surgery / Armour and Company.

Contributors

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PRODUCTS
OF THE

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The Digestive Ferments

AND THEIR USES

in Medicine and Surgery



Compliments of

ARMOUR & COMPANY

Chicago

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1893



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A FEW WORDS
IN LIEU
OF A
PREFACE



THE HISTORY of attempts to isolate the Digestive Ferments is a record of an enormous amount of careful and persistent labor crowded almost within the last decade.

When the peculiarly sensitive properties conferred by life upon highly organized materials are to be conserved, the difficulties have been to secure the molecules in that condition of activity with which Nature endowed them, before the unbuilding process begins, and to protect them against subsequent septic contaminations. It is not strange, then, that commercial Digestive Ferments of high grade have been the exception. Since the introduction of high grade Digestive Ferments, their great value in medicine and surgery have been so well and widely attested that occasional unfavorable reports are now generally traceable to the use of low grade preparations, of too small doses even of those of high grade, and to incompatible combinations.

Our design is to place in condensed form that which both physician and pharmacist will

find practically useful, as well as suggestive, concerning the various commercial forms of the Digestive Ferments, and predigested foods or products of their action upon alimentary substances, as also other preparations derived from animals used as food.

The achievements of science have so accumulated as to compel not only divisions and subdivisions, but sub-divisions have gradually become general headings to be again classified into departments of special study, particularly when practically applied in the arts. Physicians and Pharmacists must now more than ever before look to specialists for their supplies—the former giving most attention to *quality* and the latter to *cost*, as necessary prerequisites to success.

Chemists and physicians have gradually come to realize that the Digestive Ferments are biological rather than chemical in their nature, that their mode of action is distinctively physiological, and that they must be treated accordingly both in and out of the laboratory; the results being that much greater progress has been made during the last few years in the method of their preparation, the elimination of inert or injurious impurities, and in their medical and surgical application, than was previously accomplished. We

have learned how to accurately gauge their digestive powers—which is of itself a most important gain not alone for the reputation of the ferments themselves, but as a medicinal and commercial safeguard. It is significant that the new U. S. Pharmacopœia has advanced the official standard of pepsin to one capable of dissolving not less than 3000 times its weight of coagulated egg-albumen.

With more accurate knowledge of the peculiar nature of the Digestive Ferments, and the destructive work of bacteria, came a realization of the *vital* importance of applying improved methods to *perfectly fresh raw materials* instead of to those which were in process of decomposition. This realization put in practice was the first and paramount step which marked decided advance. The essential requirement of freshness of materials, together with the large plant, special and expensive machinery and apparatus necessary to handle quantities of such materials expeditiously, have taken the preparation of the Digestive Ferments out of the hands of the general manufacturing pharmacist and made it a specialty, changing the place of manufacture and locating it in close proximity to the place where animals are slaughtered.

ARMOUR & COMPANY,

Chicago, Ill.



THE DIGESTIVE FERMENTS.

The Digestive Ferments are peculiar to themselves. They have no properties in common with ordinary chemicals and drugs, either in their relation to other bodies or in their action. They effect changes in other materials without themselves undergoing change or loss of power. They are probably the most delicate and sensitive class of agents known, requiring special care during the processes of isolation and combination in commercial forms, and in their subsequent use.

We have no chemical formulas for them, as they have never been secured in a state even approaching absolute purity—nor do we know that they can be, for we do not know whether or not they consist of matter or force. We do

know that the ferments are the product of living cells, and that the commercial forms are detached repositories of cell force, capable of manifesting their peculiar powers to a greater or less extent according as more or less associated inert materials are eliminated.

In reference to the general characters of the commercial forms of the Digestive Ferments, they are chemically and physically almost identical. Soluble in water, dilute alcohol and in glycerine, and are precipitated from solution by strong alcohol. They are active in solution only, under certain conditions of temperature—below about 40° F. they are latent, slight action at 40° F. which increases with the rise of temperature. At 130° F. pepsin attains its maximum activity—pancreatin acts better at a lower temperature; above 130° F. their action becomes slower, and before reaching 160° F. to 170° F. their powers are entirely destroyed. They are also made inert by contact with some substances, and their action retarded in varying degrees by others. Each ferment, however has its own idiosyncrasies as regards action in presence of acid or alkali and in neutral solution. Pepsin, for example, is active in acid solution, inactive when neutral,

and destroyed if rendered alkaline. Each ferment has its special correlative principle or group on which, alone, it can act. The ferments administered internally supply deficient digestive power; some of them used as surgical solvents remove dead tissue and are without action upon living matter; if allowed to act upon foods outside the stomach, such foods become predigested or soluble and diffusible and are thus fitted for speedy assimilation, whether introduced by mouth or per rectum.

INCOMPATIBLES AND INHIBITANTS.

While most important to physician and patient to avoid bringing anything in contact with any of the digestive ferments which materially retards, suspends, or destroys their action, it is not to be overlooked that the conclusions, as to what are incompatibles, are drawn from experiments outside the stomach, which have led to the extreme idea that almost all medicinal substances are, at least, inhibitants. Even admitting this as true in external tests, it can be shown that the retarding action of very many substances is mechanical rather than chemical,

and therefore has no application within the stomach. Alcohol is found to greatly retard the action of pepsin, but in the stomach we know that alcohol is quickly absorbed, thus leaving the ferment free to exert its full power. An alkaline solution quickly destroys pepsin outside the stomach, but in the stomach the alkali is instantly neutralized and counts for nothing as an incompatible or even an inhibitor.

Repeatedly, have articles been published which reflected severely upon the medical profession because of the disregard of incompatibles in writing prescriptions directing the use of pepsin. While there has been some reason for such criticisms, it is curious that the admixture of pepsin and sodium bicarb. has been, more than any other combination, referred to as the strongest evidence of "lamentable ignorance" concerning pepsin on the part of the physician. As in matters of every day life, so in medical practice, physicians prescribe what they find effective whether conforming to theory or not—reasons can come later. Because pepsin is instantly destroyed by an alkaline substance in the presence of water, the experimenter jumps to an indiscriminating conclusion. Let any one mix together, as inti-

mately as he chooses, pepsin and sodium bicarb, both dry, and then dissolve the mixture in an excessive quantity of *acidulated* water such as used in testing pepsin, and he will find the peptic action unimpaired. The soda cannot render the pepsin alkaline until in solution, and it cannot get in solution in presence of an acid without simultaneously ceasing to be an alkaline substance whether in or out of the stomach. So when such a mixture is properly introduced into the stomach, the soda performs the work intended by the prescriber without detriment to the pepsin. Frequently, however, such a mixture is improperly taken by the patient, and so allows of destruction of the pepsin. The proper method of administration is in a capsule.

The co-operative effect of pepsin, or its synergistic action, has led to its successful use in combination with other remedies. While it is true that pepsin meets with quite a number of incompatibles in medicine, it is also true that the utmost many so-called incompatibles can do is to simply retard, temporarily suspend, or render latent the pepsin until the associated remedy is assimilated, the pepsin immediately re-instating the stomach to its normal condition. In general,

the incompatibles of pepsin are styptics, alkalies, strong alcoholic or saline solutions. The disturbing action, of some remedies, upon digestive power is a long recognized fact, and physicians now largely rely upon pepsin to both prepare the stomach for the reception of medicines, and to repair any damage done to the stomach or its functional power by their administration.

Any substance which neutralizes the free acid essential to peptic activity suspends action in our outside tests—metallic iron or its oxides, for instance. But the gastric fluid is usually amply acid, and provides for such cases—it is a significant fact that upon partially neutralizing the acids in the stomach, the normal percentage is at once re-established, as though automatically.

Many more examples could be given, but these serve to show that Nature is not hampered as we are in our laboratory tests, but is adaptive and largely provides for contingencies.

Thus disposing of the long list of inhibitors—like cutting down the list of exceptions to a rule of grammar—we have, now, the general rule, that we avoid mixing or treating with the Digestive Ferments, before they are administered, anything which is known to destroy them

outside of the stomach. What destroys a ferment outside the stomach has, usually, no such effect if given before or after its administration—let Nature once get her hold on a ferment and she will guard it against intruders. Briefly then, solutions of the ferments must not be made with or exposed to a temperature above 130° F. An acid *solution* of pepsin must not be mixed with pancreatin, or an alkaline *solution* of pancreatin mixed with pepsin. An alkaline substance must not be added to a pepsin *solution*, neither should a *solution* of pancreatin be rendered strongly acid. Diluents and solvents of the Digestive Ferments should be the sugars, water, mixtures of water and glycerine, water containing not over 20 per cent alcohol, and in the case of pepsin, dilute acids.

PEPSIN.

THE U. S. PHARMACOPŒIA (1890) DEFINES
PEPSIN AS FOLLOWS:

“*Pepsinum* (Pepsin): A proteolytic ferment, or enzyme obtained from the glandular layer of fresh stomachs from healthy pigs, and capable of digesting not less than 3000 times its own weight of freshly coagulated and disintegrated

egg albumen, when tested by the process given below:

“A fine, white, or yellowish-white, amorphous powder, or thin pale yellow or yellowish, transparent or translucent grains or scales, free from any offensive odor, and having a mildly acidulous or slightly saline taste, usually followed by a suggestion of bitterness. It slowly attracts moisture when exposed to the air.

“Soluble, or for the most part soluble, in about 100 parts of water, with more or less opalescence; more soluble in water acidulated with hydrochloric-acid; insoluble in alcohol, ether, or chloroform.

“On heating a solution of pepsin in acidulated water to 100° C. (212° F.) it becomes milky, or yields a light flocculent precipitate, and loses all proteolytic power. In a dry state it can bear this temperature without injury.

“Pepsin usually has a slightly acid reaction. It may be neutral, but should never be alkaline.”

The commercial article contains, in addition to pepsin, a milk-curdling ferment. The relative proportions of these depend upon the source of the pepsin. The stomach or rennet of the calf

contains chymosin in large proportion, while pepsin preponderates in the stomach of the pig.

Pepsin converts proteids into peptone through progressive steps of intermediate products, only in presence of water and an acid. Water containing 0.2 per cent absolute hydrochloric acid, and a temperature of 130°F., are the most favorable conditions—though various acids in varying proportions render pepsin active.

The milk-curdling ferment on the other hand, curdles milk which is acid, neutral, or slightly alkaline. Advantage is taken of the milk curdling ferment of pepsin preparations to prepare junket or curds and whey for the sick and as a table delicacy—(see recipes).

When it is considered that digestive ferments are not drugs, are not substances foreign to the human system, it will be, readily, seen that there is no fixed dose, and no overdose. Notwithstanding recent improvements in quality and strength, the tendency is towards larger doses. The quantity administered depends largely on circumstances. Prompt action is obtained by ten or fifteen grain doses of a 1:2500 or 1:3000 power pepsin. Should the patient manifest sour stomach, sodium bicarb. should precede the pepsin, or

a dry mixture of the two in capsule should be administered.

The underlying principle in the use of pepsin or pancreatin as solvents in surgery is that these agents have no action upon living tissue, but engage themselves in seeking out and removing that which is dead. (As we write this, we are just in receipt of a very interesting report from a well-known eye specialist, informing us of the most gratifying success obtained by him in the use of a solution of our pepsin as a wash to remove dead tissue from the eye.) In the light of this guiding principle a host of applications suggest themselves to the mind of the thoughtful surgeon who can trust pepsin to work amidst healthy and diseased materials, knowing that if allowed the necessary conditions, it will faithfully seek out and remove abnormal matter; as unbuilding or disorganization proceeds, pepsin or pancreatin removes the *debris*. The conditions to be observed in all cases wherein pepsin is to be used outside of the stomach are:

First—The pepsin should be freely soluble in water.

Second—The presence of as much water as possible containing about 1 per cent of hydro-

chloric acid; U. S. P.—temperature, that of the body and preferably higher, up to 130° F.; and time.

Third—In proportion to the amount formed of the products of the action of pepsin, is peptic action retarded, until finally it ceases altogether; therefore, either the solution of peptone and intermediates must be removed from time to time, and a fresh solution of pepsin applied, or recourse be had to dilution with slightly acidulated water, according to circumstances.

For surgical use, the ferment can be freely applied in dry form or in solution, with or without glycerine, preferably warm, as occasion requires;—in some cases the spray is convenient. A slightly acidulated solution of pepsin is found useful applied frequently and in considerable quantity to diseased tissue or such other abnormal albuminous matter as muco-pus, ulcers, cancer, gonorrhœa and urethral stricture, subsequently irrigating, then flushing with hydrogen peroxide. Applied to false membranes, a high test aseptic pepsin, only, can be relied upon for speedy work, and in critical cases a pepsin should be used which has been carefully tested (see Pepsin Assay) or which has been guaranteed as to

strength by a reliable maker. It is generally advisable to use antiseptics immediately after a ferment has done its work—hydrogen peroxide, creosote, boracic acid, thymol, salicylic acid, etc.

A word concerning ferments from the vegetable kingdom, under various names, as papain, papoid, bromelin, etc. These having again and again been found to be practically inert, we will not enter upon a discussion of them, but will simply remark that no substitute or equivalent has yet been found in the vegetable world for any digestive ferment except salivary or pancreatic diastase.

TESTING PEPSINS.

The following reliable methods of determining the digestive (or more properly, dissolving) power of one or more commercial pepsins, are given that those interested may verify our claims.

The first method given is the six hour test, adopted by the Committee of Revision of the U. S. Pharmacopœia, 1890.

The second, is a short method of verification which we have by repeated trials proved to be reliable, and by its use much time is saved.

VALUATION OF PEPSIN.—Prepare, first, the following three solutions:

(A) To 294 Cc. of water add 6 Cc. of diluted hydrochloric acid.

(B) In 100 Cc. of solution A, dissolve 0.067 Gm. of the pepsin to be tested.

(C) To 95 Cc. of solution A, brought to a temperature of 40° C. (104° F.), add 5 Cc. of solution B.

The resulting 100 Cc. of liquid will contain 0.2 Cc. (0.21 Gm.) of absolute hydrochloric acid, 0.00335 Gm. of the pepsin to be tested, and 98 Cc. of water.

Immerse and keep a fresh hen's egg during fifteen minutes in boiling water; then remove it and place it into cold water. When it is cold, separate the white, coagulated albumen, and rub it through a clean sieve having 30 meshes to the linear inch. Reject the first portion passing through the sieve. Weigh off 10 Gm. of the second, cleaner portion, place it in a flask of the capacity of about 200 Cc., then add one-half of solution C, and shake well, so as to distribute the coherent albumen evenly throughout the liquid, then add the second half of solution C, and shake again, guarding against loss. Place the

flask in a water-bath, or thermostat, kept at a temperature of 38° to 40° C. (100.4° to 104° F.), for six hours, and shake it gently every fifteen minutes. At the expiration of this time the albumen should have disappeared, leaving at most only a few, thin, insoluble flakes, (trustworthy results, particularly in comparative trials, will be obtained only if the temperature be strictly maintained between the prescribed limits, and if the contents of the flask be agitated uniformly, and in equal intervals of time).

A 100 MINUTES ASSAY.—We have found that any pepsin tested under the following conditions, will in 100 to 105 minutes dissolve exactly one-half as many times its weight of coagulated egg-albumen as by the six-hour test. We can thus obtain reliable results without so much sacrifice of time, a pepsin dissolving 1000 times its weight of albumen at 125° F. in 100 minutes, will dissolve 2000 at 104° F. in 6 hours. The conditions are: The same relative proportions of the acidulated water and albumen as by the long time test; but one-half of each as compared with the weight of pepsin used; temperature 125° F.; agitation every 5-10 minutes; time 100-105 minutes; practically complete solution of all the albumen

present. Hence the following formula; for the sake of even numbers and a unit, a 1:2000 test pepsin is designated.

Take pepsin (1:2000 by the six-hour test)
0.01 parts, or gm. or $\frac{1}{4}$ gr.

Coagulated egg-albumen (fresh egg, boiled 15 minutes,
white pressed through 30 mesh hair sieve).
10 parts, or gm. or 250 gr.

Distilled water containing 0.2 per cent. HCl,
100 parts, or gm. or cc. or $5\frac{1}{2}$ fl. oz.

Using the above designated number of *grams*, a flask is required of at least 100 Cc. capacity when about two-thirds full; or $5\frac{1}{2}$ fl. oz. for the *grain* weights given. For every 100 Gm. of albumen required provide 3.33 fresh eggs. Measure prescribed quantity of acidulated water at ordinary laboratory temperature. Put the pepsin in the flask with a little of the acidulated water; follow with the albumen previously triturated with some of the acidulated water; rinse mortar and neck of flask with remaining acidulated water, and immediately set flask in a water-bath, which is already at 125° F. Maintain this temperature within a degree above or below for 100-105 minutes, rotating flask every 5-10 minutes. If several tests are to be compared as to relative quantities of residual albumen, should

there be any, the flasks should be rapidly cooled to below 60° F. In determining the power of different pepsins, the only allowable variation from above formula should be the proportion of pepsin—of a pepsin testing 1:2500 in 6 hours, 0.008 Gm. would be required to do the work of 0.01 Gm. of a pepsin testing 1:2000 by the six-hour test.

Generally the operator knows enough about a pepsin to be assayed, to judge closely as to the quantity to use. In any event he can soon determine by one assay whether or not a given brand is of the power claimed for it. If nothing is known about the pepsin to be assayed, one test with 0.01 Gm., another with more, and a third with less of the pepsin, can be made simultaneously, and judgment formed from results about quantity required for the final test. As a safeguard, and especially to provide against variations in albumen, it is advisable always to carry through one control test with a pepsin of known power.

When several tests are to be made of one brand of a soluble pepsin, or when minute quantities cannot be accurately weighed, it is often an advantage to make a solution of a known quan-

It is well known that the medical profession has long used preparations composed of a mixture of pepsin and pancreatin, and continues to use them, notwithstanding all that has been said against such "jumbles," and in the face of all the harsh expressions reflecting upon the intelligence of physicians.

A physician of high standing, who had given some attention to laboratory experiments with the digestive ferments, was asked why he prescribed "Armour's Lactated Pepsin"—a mixture of all the principal ferments. His answer was, that though theoretically opposed to its use, he obtained unmistakably good results, and such as he could not attribute to pepsin alone. A medical man suffering from intestinal indigestion, but strongly opposed to the administration of pancreatin was induced to take a fairly large dose, whereupon he remarked: "Yes, the stuff did me good, confound it!" These answers remind one of the great English engineer who, in giving his opinion of Ericsson's engine, said: "Its wrong in principle, but the d——d thing works."

The proper time to administer pancreatin for action *in the stomach*, is just before or during meals, or immediately after eating, before acidity

of the stomach is pronounced. If it is desired that the pancreatin pass the pylorus so as to act in the small intestines, it should be given in reasonably large doses after gastric digestion has ceased, when acidity of the stomach is at its minimum.

TESTING PANCREATIN.

The method prescribed in the U. S. P. 1890, is as follows:

“If there be added to 100 Cc. of tepid water
“contained in a flask, 0.28 gm. of pancreatin
“and 1.5 gm. of sodium bicarbonate, and after-
“wards 400 Cc. of fresh cow’s milk previously
“heated to 38° C. (100.4° F.), and if this mixture
“be maintained at the same temperature for
“thirty minutes the milk should be so completely
“peptonized, that, if a small portion of it be
“transferred to a test tube and mixed with some
“nitric acid, no coagulation should occur.”

If the proteid changing ferment is found intact, the conclusion is safe that the remaining principles are also present in an active condition; for the method of preparation which conserves the one, necessarily preserves the other associated ferments.

THE ARMOUR LABORATORY.

The Armour laboratory is located close to where over a million and a half of hogs, over a million cattle, over six hundred thousand sheep, and a large number of calves, are killed annually, assuring a large supply of *very fresh raw materials*, an advantage rarely enjoyed by those engaged in preparing physiological remedies and adjuncts derived from the animal kingdom. The exceeding proneness of animal matter to decompose, in the condition in which it is necessary to convey it—hog's stomachs and pancreas, for examples—from the place of slaughter to the laboratory as ordinarily located, renders it imperative to avoid this loss of time during transit. This becomes most important in view of the fact that some of the toxic principles are formed before decomposition becomes manifest to the senses. Manufacturers of the digestive ferments now realize these points more than ever before, for but few of them can locate favorably.

The Armour laboratory is probably the largest of its kind in the world, and is equipped with the best and original apparatus and machinery especially constructed for carrying out the various processes, in the shortest time

possible, and under the most favorable conditions. These advantages of location, apparatus, machinery, largely original processes, and ample capital, have to a great extent taken the class of goods prepared in the Armour laboratory out of the hands of those unfavorably located and with poor facilities, and have elevated them to a standard of excellence seldom attained. Every preparation made is carefully tested prior to being put up, so that positive reliance may be placed upon an exact correspondence between a label and that to which it refers.

PRODUCTS OF THE ARMOUR LABORATORY.

The following comprises those now made in the Armour laboratory, new preparations from time to time being added as occasion demands. It will be observed that the products are limited to those the active principles of which are derived from *animals*, and consist of the *Digestive Ferments* in their various solid and liquid forms—used as remedies, surgical solvents, and for predigesting foods; of *predigested food products* prepared especially for those having weak digestive

powers and for invalids; and of some other remedial preparations of a different character.

**Armour's
Soluble Pepsin,
Granular and
Powdered,
U. S. P. 1890.**

1:3000

**Soluble Pepsin
Scales or
Powdered.**

1:4000

1:5000

1:6000

These are high grade non-hygroscopic pepsins, and while freely soluble in water, they resist all tendency to absorb moisture. They are practically odorless and free from unpleasant taste.

They are eminently adapted for all purposes for which pepsin is or can be used, each combining *all* the good qualities and possessing none of the objectionable characteristics of ordinary commercial pepsins.

Our very concentrated or high testing soluble pepsin applied to diphtheritic membranes, gangrenous wounds, coagula, etc., is a powerful aid to surgeon and physician.

**Armour's
Insoluble Pepsin
Powdered.**

1:3000

This is an older form of pepsin. It is non-hygroscopic, and well adapted for dispensing in powdered form or for making saccharated pepsin. It is especially useful as giving the least trouble in making tablets or preparations the compounding of which requires the use of liquids

afterwards to be removed by evaporation. This pepsin becomes soluble in the stomach.

**Armour's
Precipitated
Pepsin,
Powdered.**

1:3000

This is one of the oldest forms of insoluble pepsin. Made by the "Sheffer process," but brought to a much higher test than that usually met with.

Its special uses are the same as the preceding. This form is generally used in preparing lactated pepsin.

**Armour's
Tablets of Pure
Pepsin.**

3 grains each.

A convenient and portable dosage form of pepsin. These tablets are made of equal parts of our Soluble and Insoluble forms of pepsin, and are permanent in character, quickly dissolving in the stomach.

**Armour's
Glycerole Pepsin,
Concentrated.**

**10 M.=1 gr. of
1:3000 pepsin
U. S. P. 1890.**

This preparation is the equivalent of Armour's Soluble Pepsin, adjusted to the most convenient relation of weight to volume. A solution made permanent by means of the purest glycerine obtainable. As it is free from all additions other than a somewhat

diluted glycerine, it is miscible with all liquids compatible with pepsin in solution.

This is a convenient form of pepsin for quick adjustment by measure instead of by weight of any required quantity of 1:3000 test pepsin, avoiding the necessity of bringing the dry form into solution and perhaps having to filter it—a convenience on the prescription counter, to the manufacturing pharmacist, in the physician's office or pocket case, and especially useful as a surgical solvent.

**Armour's
Essence of
Pepsin.**

A stimulating form of pepsin, probably the most agreeable, particularly to the sick-sensitive stomach. In addition to its use as a pleasant means of administering pepsin, its carminative properties makes it of special value in cases of infantile troubles during the period of dentition. This essence is well adapted as a vehicle for other medicines, especially when the synergistic action of pepsin is desired, and is a convenience to the druggist in making up elixirs. Being rich in the milk-curdling ferment, it is useful for preparing junket or curds and whey—a most acceptable, nutritious and easily assimilated

food. The Essence should be given in two to three teaspoonful doses; to infants ten to fifteen drops.

RECIPE FOR PREPARING JUNKET OR CURDS AND WHEY.

Put half a pint of lukewarm milk into a bowl and add one teaspoonful of Armour's Essence of Pepsin. When cold it may be eaten plain, or with sugar or cream, with addition of grated cinnamon or nutmeg according to taste.

If the whey alone is desired, the cold curd is to be whipped, as in beating eggs, and then strained out. The whey contains the pepsin of the essence added.

**Armour's
Pepsin—
Phosphate.**

A liquid form of pepsin with phosphoric acid.

It is found that the cause of the popularity among physicians of phosphoric acid and the unorganized phosphates, is not that they serve directly as food to nerves and brain, but that they act mediately, by reinforcing the gastric fluid. Pepsin-phosphate supplies gastric deficiency as well as phosphoric acid, and is therefore a *natural tonic*. Properly diluted with

water and sweetened, it is a pleasant acidulous drink.

**Armour's
Pancreatin,
Powdered.
U. S. P. 1890.**

A partially soluble permanent form of pancreatin. Physicians can rely upon this article as containing in a most concentrated and active form all the ferments of the pancreas—trypsin, steapsin, chymosin, amylopsin—in exactly the relative proportions existing in nature. This is perhaps the best form for administration when desiring that it shall act in the *small intestines*.

**Armour's
Soluble
Pancreatin,
Granular and
Powdered.**

This is a recent addition to our list—a completely soluble form of pancreatin, of the same degree of concentration as Armour's partially soluble pancreatin, and contains all the ferments of the pancreas in their natural proportion.

This soluble pancreatin is the best form for administration when its action is desired more particularly in the stomach. It is especially useful in preparing the liquid forms and combinations of pancreatin, and as a surgical solvent.

**Armour's
Pancreatin and
Soda Tablets.**

Each Tablet Contains:
Pancreatin 2½ gr.
Sodium Bicarb. 8 gr.
In tubes of 15 tablets.

A convenient quantitative form of pancreatin for peptonizing or pre-digesting milk and other foods for infants and invalids—see recipes.

RECIPES FOR PRE-DIGESTING FOODS FOR INFANTS AND
THE SICK, BY MEANS OF

ARMOUR'S PANCREATIN AND SODA
TABLETS.

The finger of modern science points to *pre-digestion* of foods, by Nature's processes, as one of the most natural preliminary methods of lightening the burden upon weak or enfeebled digestive organs. Pre-digestion of foods in general is best accomplished by the use of those digestive ferments which have been fabricated by Nature and naturally associated together to act upon every variety of food, and simply placed in available form by the chemist. These ferments are found in combination in *Pancreatin*, which, if carefully prepared from very fresh material, rapidly digests *all* foods. Thus we have the means of pre-digesting any of the albuminous or proteid foods, as flesh, casein of milk, egg-albu-

men, gluten, legumin; the starch of cereals, leguminous plants, and fatty matters from whatever source.

For convenience, we have placed our pancreatin in the quantitative tablet form, combined with the proper proportion of sodium bicarbonate. Also, with a view to aiding both physician and nurse in peptonizing and otherwise properly preparing foods suitable for the sick-sensitive stomach, the following recipes are given. By this means may be brought about a most desirable co-operation between him who directs medication, and the one in charge of feeding.

RECIPES.

PEPTONIZED MILK—COLD PROCESS.

1. Pre-digested milk is found to be the most perfect food for infants and invalids. Reduce one of the Pancreatin and Soda Tablets to a powder with a spoon, mix with a half-cup of water, and add a half-pint of milk, then let the whole stand for about three hours before using. In warm weather the mixture had best be kept cool artificially during the process, and thereafter kept on ice. It is generally advisable to warm the milk before using.

PEPTONIZED MILK—QUICK PROCESS.

2. In case the milk which has been peptonized cold is found to disagree with the patient, or if it is required quickly, follow directions given in preceding recipe, but use the water and milk as warm as is comfortable to the hand (about 110° - 115° Fahr.), keeping the mixture as near this temperature as possible by allowing it to stand in a warm place or by setting the container in a quantity of tepid water. In fifteen to twenty minutes the prepared milk should be used at once, heating it still more if desired; or if its use is delayed, it should be immediately made cold by ice, to prevent a too pronounced bitter taste being developed.

If the patient objects to a bitter taste, which may be reached by carrying the process too far, the time allowed for peptonization can be shortened a little, or the taste can be disguised with sugar, flavoring, or both.

PEPTONIZED MILK—WITH FRUIT JUICES.

3. Occasionally it is desirable to carry the process nearer or quite to complete pre-digestion. In such a case fruit juices are both acceptable and admirably well adapted for covering the bitter taste—in fact the use of fruit juices with milk re-

quires that peptonization be carried far enough to make the milk and fruit acids compatible.

PEPTONIZED BEEF TEA.

4. Most grateful, stimulating and with added nourishment—may be prepared for immediate assimilation as follows: To half a pint of boiling water add half a teaspoonful of Armour's Extract of Beef; stir in about three teaspoonfuls of any farinaceous food, and boil the mixture sufficiently to soften the starch; then cool until comfortable to the hand, powder and add two of the tablets; keep the whole warm for two or three hours, finishing the preparation by seasoning and bringing it to a boil. With some of the coarser cereals, straining is advisable before giving to the patient.

PEPTONIZED GRUEL.

5. Starch and gluten of wheat flour or other farinaceous food—as arrowroot, oatmeal, sago, pea flour—may be adapted for the use of invalids, and especially young children, by boiling well with water, then mixing with milk, and the whole pre-digested as directed by recipe 2, using one or two tablets, according to the quantity of the gruel. Peptonized milk alone greatly aids the digestion of farinaceous foods if they are eaten together.

PEPTONIZED OYSTERS.

6. Make an ordinary stew—half a dozen oysters with their juice, half a cup of water, and a half-pint of milk; chop the oysters into small bits, afterwards returning them to the stew, cool somewhat, then add two of the powdered tablets, and maintain the warmth for about forty minutes; boil and strain.

PEPTONIZED MILK TOAST.

7. Made with more than the usual proportion of milk, may be pre-digested with two tablets to the pint. The crusts should afterwards be removed and the preparation brought to a boil.

**Armour's
Glycerole
Pancreatin.
Concentrated.
10 M.—1 gr. of
Pancreatin.**

An equivalent of Armour's Pancreatin, in a convenient relation of weight to volume. A solution protected by pure glycerine. Miscible with all compatible liquids. Convenient for measuring off any desired weight of dry pancreatin, without the necessity of making and filtering a solution. Convenient alike to pharmacist, physician and manufacturer of liquid preparations of pancreatin. As a surgical solvent it is the most useful form of pancreatin.

**Armour's
Lactated Pepsin.**

A mixture of all the digestive ferments contained in commercial Pepsin and Pancreatin, and Lactic and Hydrochloric Acid, with Milk Sugar:—Ptyalin, Pepsin, Chymosin, Trypsin, Steapsin, Lactic Acid, Hydrochloric Acid, Milk Sugar.

Indicated in all cases of weakness or impairment of the nutritive powers, and the many diseases due to mal-assimilation of food.

**Armour's
Nutrient Wine of
Beef-Peptide.**

Each fluid ounce contains, pre-digested, the nutritive constituents and stimulant of one ounce of lean beef, in sherry wine.

PEPTONE—made by peptic digestion of *fresh, raw, lean beef*, subsequently *sterilized*—is the basis of this *stimulating pre-digested food*, preserved in sherry wine. This preparation is entirely free from any addition of converted starch or dextrin, containing, essentially, nothing but a high percentage of beef-peptide dissolved in wine—actual nutriment in the most assimilable form.

Food is the *foundation* of life; assimilation of food the *condition* of existence. On assimilation and consequent nutrition depend maintenance of health and recovery from disease.

As a distinguished writer says: "If we could

examine the statistics of all the medical cases which occur in the practice of the physician, we should most probably find that nearly eighty per cent. of the patients who apply for relief, suffer from organic diseases or functional disorders due, directly or indirectly to mal-assimilation of food. The impaired condition of the nutritive powers—that is, the imperfect performance of the digestive and assimilative functions—will account for most of the misery and suffering which the modern physician is called upon to remove or alleviate.’

There are three general methods pursued in the treatment of imperfect nutrition and its consequences. These are:

(1) STIMULATING TO ACTION THE DIGESTIVE POWERS. Stimulation, by means of tonics, serves in cases of temporary impairment of the digestive apparatus. It is the application of the lash to dormant, weak, or over-worked functions.

(2) SUPPLYING DEFICIENT DIGESTIVE POWER. By this method the digestive organs are assisted and relieved of overwork, by administering the very substances Nature fabricates for the purpose of digesting foods—it is lending a helping hand to the tired or worn out functions, giving them less work and the opportunity to recuperate.

(3) FURNISHING PRE-DIGESTED FOODS. This is precisely the opposite of stimulation, and is more than giving assistance, for by this means the digestive organs are entirely relieved, and the system receives at once strength-giving nourishment on which depends restoration of digestive power, and a return to the normal condition termed health. Pre-digestion is the kindly nurse who prepares the food and relieves the patient from all effort.

Armour's Digestive Ferments—various forms of pepsin, pancreatin, etc.—supply deficient digestive power.

Armour's Pancreatin and soda tablets give the means of pre-digesting all varieties and forms of foods.

ARMOUR'S NUTRIENT WINE OF BEEF-PEPTONE is an elegant and acceptable form of pre-digested food, with the stimulants of both beef and wine. Eggs, casein of milk, gluten, albumen, and legumin, when digested, are also transformed into PEPTONE, which is then ready for immediate assimilation. The familiar and largely used preparation known as Beef, Wine and Iron is of undoubted value as a tonic, but possessing only the stimulating properties of beef in addition to the wine, it is therefore devoid of the very essential constit-

uent, which Armour's Nutrient Wine possesses, namely, nutrition.

Armours Nutrient Wine is especially serviceable in all cases of gastric weakness, debility, languor, failing strength or exhaustion, impoverished blood—in short is indicated in all conditions of low vitality. In ordinary cases of gastric weakness, debility, etc., a small wineglassful may be taken three times a day, or a tablespoonful every two or three hours. In critical cases of failing strength one or two teaspoonfuls every few minutes.

PEPTONE TEST.—When a small quantity of cupric sulphate is added to Armour's Nutrient Wine of Beef-Peptide previously diluted five or six times its volume and rendered alkaline with caustic alkali, a brilliant rose-red color is produced.

**Armour's
Beef-Peptide.
Concentrated.**

This pre-digested food is the Peptide in its pure concentrated form, as used in making Armour's Nutrient Wine of Beef-Peptide. It is useful when alcohol is contra-indicated, but is prepared more especially for the convenience of manufacturing pharmacists in making liquid forms of food.

**Armour's
Solid Extract of
Beef.**

One pound is the concentration of all that can be obtained by slow and long-continued cooking of 45 lbs. of lean beef. It provides a convenient means of making delicious Beef Tea on short notice,—is invaluable as a “stock” for soups and sauces, and in the form of Bouillon possesses the distinctly peptogenic attribute of causing a free flow of gastric juice, and thus preparing the stomach for the reception of heavier food.

**Armour's
Fluid Beef
Extract.**

Is similar to the paste form, in its origin and manipulation, but is arrested in fluid form at an earlier stage of evaporation than in the case of the solid extract. It is more quickly mixed with water than is the *solid*, and the flavor is if anything a trifle more *beefy*.

**Armour's
Vigoral.**

Is a combination of Armour's Extract of Beef and Powdered Beef Fibre. It is specially designed as a finely seasoned, nourishing and stimulating beverage—particularly appropriate as a hot drink in cold weather.

**Armour's
Fountain
Bouillon.**

A happy combination of
Armour's Fluid Beef Extract,
with the nerve-tonic properties of celery extract.
Recommended as an especially appropriate bev-
erage for fountain use.

**Armour's
Inspissated
Ox-Gall, U.S.P.**

**Armour's
Desiccated
Ox-Gall.**

We claim nothing more for
these preparations than that
they are made from *very fresh*
raw material. Ox-gall dis-
solved in diluted glycerin, has proved of value as
a laxative enema.

**N. B.--The products of
The Armour Laboratory secured**

The Highest Award

**at the World's Fair, Chicago
...1893...**

SELECT FORMULAS

FOR PREPARATIONS CONTAINING THE DIGESTIVE FERMENTS.

GENERAL NOTES.—While there are many combinations containing one or more of the digestive ferments with medicinal substances, by which the therapeutic value of the latter is enhanced and the action of the former uninjured, there are some combinations which while of value when mixed dry, are in the liquid form either pharmaceutically or medicinally incompatible, as in the case of Elixir of Pepsin and Bismuth. The mixture of Pepsin and a salt of Bismuth in dry form is of great efficiency, but in the necessary process of neutralizing the bismuth salts, the ferment is destroyed. We shall endeavor to avoid giving any formulas which are of questionable value.

To retain the activity of pepsin, whether alone or associated with other remedies, its solution must at *all times* be at least neutral and preferably have an acid reaction. If a formula calls

for both alkaline and acid substances, the latter being predominant, so that the finished preparation is acid, the addition of the alkali to the pepsin would destroy it, and the subsequent addition of acid would not restore the peptic power.

The activity of pancreatin solutions must not be injured by being made strongly acid.

In preparing the various elixirs, wines, etc., of any of the digestive ferments and their combinations, the least troublesome way is to make up a sufficiency of a concentrated simple elixir as a starting point, to portions of which can be added the desired ferment or ferments—either pepsin or pancreatin—and such other compatible medicines as may be desired, to make the various palatable liquid preparations. Armour's Essence of Pepsin is a convenient elixir of pepsin for this purpose. Thus, to the simple elixir add a soluble pepsin and the product is elixir pepsin; to this—or to Armour's Essence of Pepsin—add iron citrate to make elixir pepsin and iron (or elixir pepsin ferrous). In this way can one elixir be frequently built up from another simpler one, saving time and labor. Variations in appearance are made by the use of coloring substances, as caramel, cudbear, cochineal, etc., and modifications of flavor

by additions of small proportions of suitable essential oils previously subdivided by means of talcum.

The proportion of alcohol in any preparation of the digestive ferments should not exceed 20 per cent. by volume.

Before adding strychnia to an elixir, it should be dissolved by rubbing to a paste with water and then adding a few drops of citric acid solution.

The following comparison will be found useful:

100 gr. Pepsin N. F. are represented by $16\frac{2}{3}$ gr. of Pepsin U. S. P 1890, or Armour's 1:3000 pepsins; or by 167 m. of Armour's Glycerole Pepsin conc.

CONCENTRATED SIMPLE ELIXIR.

℞ Simple Syrup, $2\frac{1}{2}$ pints.
Tinc. Cardamon Com. $\frac{1}{2}$ fl. oz.
Fld. Ext. Vanilla 1 fl. oz.
Tinc. Fresh Sweet Orange Peel, 12 fl. oz.
Water sufficient to make . . . 6 pints.
Six pts. simple elixir = eight pts. finished elixir.

The tinc. sweet orange peel should be prepared from *fresh* peel to obtain the aroma which is lost by drying. Macerate one pound of the finely cut peel in diluted alcohol (cologne spirit) and obtain two pints of percolate.

To six pints of simple elixir add the medicinal ingredients in solution, cologne spirit one-tenth the volume of finished elixir to be made ($8 \div 10 = 0.8$ pints or nearly 13 fl. oz.), and sufficient water to make eight pints. This reserve of water and alcohol is to provide for making solutions requiring either or both.

Solutions can be filtered clear by means of a little talcum. Armour's liquid forms of the ferments—glycerole pepsin, essence of pepsin, and glycerole pancreatin—are especially convenient in making liquid preparations, particularly when time is an object; also in expeditiously filling prescriptions which call for any of the ferments in solution.

The following is a collection of formulas containing digestive ferments, also those containing Extract of Beef from the N. F., and Armour's Formulary for Great Britain:

℞ SACCHARATED PEPSIN, (N.F.)

Pepsin (Armour's) . . . a sufficient quantity.
Sugar of Milk, . . . enough to make 100 parts.

Triturate as many parts of the Pepsin as may be found capable of dissolving five thousand (5000) parts of egg albumen by the process of assay given under Pepsinum, or U. S. P. test,

with enough Sugar of Milk to make one hundred (100) parts.

℞ SACCHARATED PEPSIN U. S. P.

Pepsin (Armour's), 150 grains

Sugar Milk, 1350 grains

Triturate the Pepsin with the Sugar of Milk to a fine uniform powder.

℞ AROMATIC PEPSIN, (N.F.)

Saccharated Pepsin (N.F.) 1 troy ounce.

Aromatic Fluid Extract (U.S.P.) 30 minims.

Tartaric Acid, 8 grains.

Chloride of Sodium, 8 grains.

Mix the ingredients by trituration, dry the product by exposure to warm air, and keep in tightly corked bottles.

℞ AROMATIC SOLUTION OF PEPSIN, (N.F.)

Pepsin (Armours), 128 grains.

Oil of Cinnamon, 2 drops.

Oil of Pimenta, 2 drops.

Oil of Cloves, 4 drops.

Purified Talcum, 120 grains.

Alcohol, ½ fl. oz.

Hydrochloric Acid, 75 minims.

Glycerin, 4 fl. oz.

Water, enough to make 16 fl. oz.

Mix the Pepsin with eight (8) fluid ounces of water and the hydrochloric acid, and shake the

mixture frequently until the pepsin is dissolved. Add the purified talcum and the oils previously dissolved in the alcohol; mix the whole thoroughly by agitation, and filter through a wetted filter, and return the first portions of the liquid until it runs through clear. Pass enough water through the filter to make the filtrate measure twelve (12) fluid ounces. To this add the glycerin.

Each fluid drachm represents one grain of Pepsin.

℞ ELIXIR OF PEPSIN, (N. F.)

| | | |
|-------------------------------|----------------|-------------|
| Pepsin (Armour's), | | 128 grains. |
| Hydrochloric Acid, | | 30 minims. |
| Glycerin, | | 2 fl. oz. |
| Compound Elixir of Taraxacum, | | 1 fl. oz. |
| Alcohol, | | 3 fl. oz. |
| Purified Talcum, | | 120 grains. |
| Sugar, | | 4 troy oz. |
| Water, | enough to make | 16 fl. oz. |

Mix the pepsin with six (6) fluid ounces of water, add the glycerin and acid and agitate until solution has been effected. Then add the compound elixir of taraxacum, alcohol, and the purified talcum, and mix thoroughly. Set the mixture aside for a few hours, occasionally agitating.

Then filter it through a wetted filter, dissolve the sugar in the filtrate, and pass enough water through the filter to make the whole product measure sixteen (16) fluid ounces.

Each fluid drachm represents one grain of Pepsin,

ELIXIR OF PEPSIN, BISMUTH AND STRYCHNINE, (N.F.)

℞ Sulphate of Strychnine, $1\frac{1}{4}$ grains.
Elixir of Pepsin and Bismuth, 16 fl oz.

Dissolve the Sulphate of Strychnine in the Elixir.

Each fluid drachm represents $\frac{1}{100}$ grain of sulphate of strychnine, one grain of pepsin and two grains of citrate of bismuth and ammonia.

℞ ELIXIR OF PEPSIN AND BISMUTH, (N. F)

Pepsin (Armour's) 128 grains.
Citrate of Bismuth and Ammonia, 256 grains.
Water of Ammonia, a sufficient quantity.
Glycerin, 2 fl. oz.
Alcohol, 3 fl. oz.
Syrup, 4 fl. oz.
Compound Elixir of Taraxacum, 1 fl. oz.
Purified Talcum, 120 grains.
Water, enough to make 16 fl. oz.

Dissolve the pepsin in four (4) fluid ounces of water. Dissolve the citrate of bismuth and

ammonia in one (1) fluid ounce of warm water, allow the solution to stand until clear, if necessary; then decant the clear liquid, and add to the residue just enough water of ammonia, to dissolve it, certainly avoiding an excess. Then mix the two solutions, and add the glycerin, compound elixir of taraxacum and alcohol. Thoroughly incorporate the purified talcum with the mixture, filter it through a wetted filter, and pass enough water through the filter to make the filtrate measure thirteen (13) fluid ounces. To this add the syrup.

Each fluid drachm represents one grain of pepsin and two grains of citrate of bismuth and ammonia.

℞ ELIXIR OF PEPSIN AND IRON, (N. F.)

Tincture of Citro-Chloride of Iron, 512 minims.
Elixir of Pepsin, . enough to make 16 fl. oz.

Mix the tincture of citro-chloride of iron with a sufficient quantity of elixir of pepsin to make sixteen(16) fluid ounces.

℞ ELIXIR OF CINCHONA, IRON AND PEPSIN, (N.F.)

Pepsin (Armour's), 128 grains.
Hydrochloric Acid, 30 minims.
Water, 3 fl. oz.
Elixir of Cinchona and Iron,
enough to make 16 fl. oz.

R̄ AROMATIC WINE OF PEPSIN.

| | |
|-----------------------|----------------|
| Pepsin, (Armour's), | 150 grains. |
| Distilled water, | |
| Glycerin, a. a., | 5 fl. drachms. |
| Sherry Wine, | 32 oz. |
| Aromatic Tincture, | ½ oz. |
| Muriatic Acid, C. P., | 2 drachms. |

Mix, let stand several days and filter.

R̄ TINCTURE OF PEPSIN.

| | |
|----------------------|----------------|
| Pepsin, (Armour's) | 150 grains. |
| Distilled Water, | 1½ oz. |
| Glycerin, | 5 fl. drachms. |
| Muriatic Acid, C. P. | 1 drachm. |
| Alcohol, | 13 oz. |

Mix, let stand several days and filter.

R̄ PEPSIN SYRUP.

| | |
|-------------------------------|-------------|
| Pepsin, (Armour's) | 150 grains. |
| Muriatic Acid, | 1½ drachms. |
| Syrup of Orange, | |
| Syrup of Orange Flower, a. a. | 7½ oz. |

Mix.

R̄ ANTI-DYSPEPTIC PILLS, (Sass and Lincoln)

| | |
|----------------------------|-------------|
| Sulphate of Quinine, | 20 grains. |
| Pepsin, (Armour's) | 100 grains. |
| Extract of Absinth, q. s., | |

Make into 40 pills.

R PEP SIN TROCHES.

| | | |
|---|-----------|-------------|
| Pepsin, (Armour's) | | 150 grains. |
| White Sugar, | | 2 oz. |
| Tragacanth, | | 45 grains. |
| Glycerin, | | 1½ drachms. |
| Water, q. s., mix into Troches No. 100. | | |

R PEP SIN TROCHES, ACID.

| | | |
|---|-----------|-------------|
| Pepsin, (Armour's) | | 150 grains. |
| Citric Acid, | | 30 grains. |
| Tragacanth, | | 60 grains. |
| White Sugar, | | 2 oz. |
| Bole Armenia, | | 30 grains, |
| Glycerin, | | 2½ drachms. |
| Orange Flower Water, q. s. Make into Troches No. 100. | | |

COMPOUND PANCREATIC POWDER, (N. F.)

R PEPTONIZING POWDER.

| | | |
|--------------------------|-----------|------------|
| Pancreatin, (Armour's) | | 5 grains. |
| Bicarbonate, of Soda, | | 20 grains. |
| Mix them by trituration. | | |

COMPOUND POWDER OF PEPSIN, (N. F.)

R PULVIS DIGESTIVUS.

| | | |
|--|-----------|-------------|
| Saccharated Pepsin, | | 150 grains. |
| Pancreatin (Armour's) | | 150 grains. |
| Diastase, | | 10 grains. |
| Lactic Acid | | 10 minims. |
| Hydrochloric Acid, | | 20 minims. |
| Sugar of Milk, enough to make 1000 grains. | | |

Add the acids gradually to the sugar of milk, and triturate until they are thoroughly mixed. Mix the pepsin, pancreatin and diastase, then incorporate this mixture, by trituration with the sugar of milk. Finally, rub the mixture through a hair sieve, and preserve the powder in bottles.

℞ PANCREATIN SOLUTION, (N. F.)

| | | |
|------------------------------------|-----------|---------------------------|
| Pancreatin, (Armour's) | | 128 grains. |
| Bicarbonate of Soda, | | 384 grains. |
| Glycerin, | | 4 fl. oz. |
| Compound Spirit of Cardamom (N.F.) | ½ fl. oz. | |
| Alcohol, | | ½ fl. oz. |
| Purified Talcum, | | 120 grains. |
| Water, | | enough to make 16 fl. oz. |

Triturate the pancreatin and the bicarbonate of sodium gradually with ten (10) fluid ounces of water; add the alcohol, compound spirit of cardamom and purified talcum; mix them thoroughly by shaking, and pour the mixture upon a wetted filter, returning the first portions of the filtrate, until it runs off clear. Wash the filter with enough water to obtain twelve (12) fluid ounces of filtrate. To this add the glycerin.

Each fluid ounce represents one grain of pancreatin, (N. F.)

Prof. Attfield, Ph.D., F.R.S., F.I.C., F.C.S., Professor of practical chemistry to the Pharmaceutical Society of Great Britain, has kindly examined our Pepsin, to determine the extent to which it must be diluted to form Pepsin of official B. P. strength. He reports as follows:

℞ PEPsin OF OFFICIAL (B. P.) STRENGTH.

Pepsin ("Armour's Standard") powdered, 1 oz.

Sugar of Milk, - - - - 4 ozs.

Put the pepsin in a mortar, add the sugar of milk (previously well dried) little by little, triturate and finally sift.

The following formulas are taken from Armour's Formulary for Great Britain, and have met with great favor there, and in the British Colonies.

℞ ELIXIR OF PEPSIN.

Simple Elixir, - - - 15 ounces.

Glycerole of Pepsin (Armour's) 2½ ounces.

Proof Spirit, - - - 1 ounce.

Water, - - - to make 1 pint.

One fluid drachm equals three grains of B. P. Pepsin, or 0.60 grains of Pepsin U. S. P. 1890.

Dose—Half to one fluid drachm.

℞ LIQUID PEPSIN AND BISMUTH.

Simple Elixir - - - 15 ounces.

Glycerole of Pepsin, (Armour's) 2½ ounces.

(Neutralized with Solution of Ammonia.)

Ammonio-Citrate of Bismuth, - 320 grains.

(Dissolve by aid of a few drops of Solution of Ammonia, if necessary).

Proof Spirit, - - - - 1 ounce.

Water, - - - - to make 1 pint.

One fluid drachm equals three grains of B. P. Pepsin, or 0.60 grains of Pepsin U.S.P., 1890, and two grains of ammonio-citrate of bismuth.

Dose—Half to one fluid drachm.

R LIQUID PEPSIN, BISMUTH AND IRON.

Simple Elixir, - - - - 15 oz.

Glycerole of Pepsin, (Armour's) - 2½ oz.

(Neutralized with Solution of Ammonia.)

Ammonio-Citrate of Bismuth, 320 grains.

(Dissolved by aid of a few drops of Solution of Ammonia, if necessary).

Ammonio-Citrate of Iron - 320 grains.

Proof Spirit, - - - - 1 ounce.

Water, - - - - to make 1 pint.

One fluid drachm equals three grains of B. P. Pepsin, or 0.60 grains of Pepsin, U. S. P., 1890, two grains of ammonio-citrate of Iron.

Dose—Half to one fluid drachm.

R LIQUID PEPSIN, BISMUTH AND STRYCHNINE.

Simple Elixir, - - - - 15 ounces.

Glycerole of Pepsin, (Armour's) 2½ ounces.

(Neutralized with Solution of Ammonia).

Ammonia-Citrate of Bismuth, 320 grains.

(Dissolved by aid of a few drops of Solution of Ammonia if necessary).

Strychnine, - - - - 2½ grains.

(Rubbed to a paste with a few drops of water, and dissolved by five grains of Citric Acid).

Proof Spirit, - - - - 1 ounce.

Water, - - - - to make 1 pint.

One fluid drachm equals three grains of B.P. pepsin, or 0.60 grains pepsin U. S. P., 1890, two grains of ammonio-citrate of bismuth, and one sixty-fourth of a grain of strychnine.

Dose—Half to one fluid drachm.

LIQUID PEPSIN, BISMUTH, STRYCHNINE
AND IRON.

Simple Elixir, - - - - 15 ounces.

Glycerole of Pepsin, (Armour's) 2½ ounces.

(Neutralized with Solution of Ammonia).

Ammonio-Citrate of Bismuth, - 320 grains.

(Dissolved by aid of a few drops of Solution of Ammonia, if necessary.)

Strychnine, - - - - 2½ grains.

(Rubbed to a paste with a drop of water and dissolved by five grains of Citric Acid.)

Ammonio-Citrate of Iron, - - 160 grains.

Proof Spirit, - - - - 1 ounce.

Water, - - - - to make 1 pint.

One fluid drachm equals three grains of B.P. pepsin, or 0.60 grains pepsin U. S. P., 1890, two grains of ammonio-citrate of bismuth, one sixty-

fourth of a grain of strychnine, and one grain of ammonio-citrate of iron.

Dose—Half to one fluid drachm.

℞ LIQUID PEPSIN AND QUININE.

Simple Elixir, - - - 15 ounces.

Glycerole of Pepsin, (Armour's) 2½ ounces.

Sulphate of Quinine, - - - 80 grains.

(Dissolved by the aid of 80 minims of diluted Hydrochloric Acid.)

Proof Spirit, - - - 1 ounce.

Water, - - - to make 1 pint.

One fluid drachm equals three grains of B.P. pepsin, or 0.60 grains pepsin U. S. P., 1890, and half a grain of quinine sulphate.

Dose—Half to one fluid drachm.

℞ LIQUID PEPSIN AND BISMUTH COMP.

Simple Elixir, - - - 15 ounces.

Glycerole Pepsin, (Armour's) 2½ ounces.

(Neutralized with Solution of Ammonia.)

Ammonio-Citrate of Bismuth, 320 grains.

(Dissolved by aid of a few drops of Solution of Ammonia, if necessary.)

Acetate of Morphine, - - 8 grains.

(Dissolved by aid of a few drops of diluted Acetic Acid.)

Diluted Hydrocyanic Acid, 400 minims.

Proof Spirit, - - - 1 ounce.

Water - - - to make 1 pint.

One fluid drachm equals three grains of B. P. pepsin, or 0.60 grains U.S.P., 1890, two grains of Ammonio-Citrate of Bismuth, one-twentieth of a grain of Acetate of Morphine, and two and a half minims of Diluted Hydrocyanic Acid.

Dose—Half to one fluid drachm.

℞ LIQUID PEPSIN, BISMUTH AND PODOPHYLLIN.

Simple Elixir, - - 15 ounces.

Glycerole of Pepsin (Armour's) 2½ ounces.

(Neutralized with Solution of Ammonia.)

Ammonio-Citrate of Bismuth, 320 grains.

(Dissolved by aid of a few drops of Solution of Ammonia, if necessary.)

Podophyllin, - - - 16 Grains.

(Dissolved in one ounce of Aromatic Spirit of Ammonia.)

Water - - - to make 1 pint.

One fluid drachm equals three grains of B. P. pepsin, or 0.60 grains U. S. P., 1890, two grains of Ammonio-Citrate of Bismuth, and one-tenth of a grain of Podophyllin.

Dose—Half to one fluid drachm.

℞ GYCEROLE OF PEPSIN, ACID.

Glycerole of Pepsin (Armour's), 1½ ounces.

Diluted Hydrochloric Acid, 3 drachms.

Spirit of Nitrous Ether, - 40 minims.

Glycerin, - - - 2½ fl. oz. .
Chloroform Water, - to make 6 ounces.

Mix together.

Dose—One to two drachms in water.

℞ INDIGESTION AND LIVER MIXTURE.

Glycerole of Pepsin (Armour's), 3 drachms.
Solution of Strychnine B. P., 48 minims.
Diluted Nitro-Muriatic Acid, - 2 drachms.
Glycerin, - - - 6 drachms.
Tincture Cardamom Comp., 4 drachms.
Water - - - to make 8 ounces.

Mix.

Dose—One tablespoonful to be taken two or three times a day, in water.

This prescription is given as an example of the forms in which physicians may be recommended to combine hepatic stimulants with Armour's Glycerole of Pepsin in ordinary mixtures.



ADDITIONAL FORMULAS

℞ PEPTONIZED CREAM OF COD-LIVER OIL.

| | | |
|------------------------|-----|-------------|
| Cod-Liver Oil Cream,* | - | 12 fl. oz. |
| Pancreatin (Armour's), | - | 30 grains. |
| Bicarbonate of Soda, | - - | 150 grains. |

Mix the Pancreatin and the Bicarbonate of Soda in water before adding it to the emulsion.

*See "*The Chemist and Druggist*," Nov. 2d, 1889.

℞ WINE OF BEEF (N. F.)

| | | |
|-----------------------------|----------------|-------------|
| Extract of Beef (Armour's), | - | 256 grains. |
| Hot Water, | - - - | 1 fl. oz. |
| Sherry Wine | enough to make | 16 fl. oz. |

Pour the Hot Water upon the Extract of Beef contained in a mortar, or other suitable vessel, and triturate until a smooth mixture results, then gradually add, while stirring, fourteen (14) fluid ounces of Sherry Wine. Transfer the mixture to a bottle, set this aside for a few days in a cold place, if convenient, then filter and pass enough Sherry Wine through the filter to make sixteen (16) fluid ounces.

Each fluid drachm represents two grains of Extract of Beef.

℞ BEEF, WINE AND IRON. (N. F.)

| | | |
|-------------------------------------|---|-------------|
| Extract of Beef (Armour's), | - | 256 grains. |
| Tincture of Citro-Chloride of Iron, | | 256 minims. |

Hot Water, - - - - 1 fl. oz.
 Sherry Wine, enough to make 16 fl. oz.

Pour the Hot Water upon the Extract of Beef contained in a mortar or other suitable vessel, and triturate until a smooth mixture results, then gradually add, while stirring, twelve (12) fluid ounces of Sherry Wine. Next add the Tincture and enough Sherry Wine to make sixteen (16) fluid ounces. Transfer the mixture to a bottle, set this aside for a few days in a cool place, if convenient, filter, and pass enough Sherry Wine through the filter to restore the original volume.

Each fluid drachm represents two grains of Extract of Beef, and two minims of Tincture of Citro-Chloride of Iron.

℞ WINE OF BEEF, IRON AND CINCHONA, (N. F.)

Extract of Beef. (Armour's) - 256 grains.
 Tincture of Citro-Chloride of Iron, 256 grains.
 Sulphate of Quinine, - - 16 grains.
 Sulphate of Cinchonidine, - - 8 grains.
 Citric Acid, - - - - 6 grains
 Hot Water, - - - - 1 fl. oz.
 Angelica Wine, enough to make 16 fl. oz.

Dissolve the citric acid and the sulphates of quinine and cinchonidine in the hot water, and pour the solution upon the extract of beef con-

tained in a mortar, or other suitable vessel. Triturate the liquid with the extract, until they form a smooth mixture, then gradually add, while stirring, twelve (12) fluid ounces of angelica wine, and afterwards the tincture of citro-chloride of iron. Transfer the mixture to a bottle, set this aside in a cool place for a few days, if convenient; filter, and pass enough angelica wine through the filter to make sixteen (16) fluid ounces.

Each fluid drachm represents two grains of extract of beef, two minims of tincture of citro-chloride of iron, and small quantities of cinchona alkaloids.

R̄ PEPTONIZED BEEF, IRON AND WINE.

| | | |
|-----------------------------|-------|----------------------------|
| Beef Peptone (Armour's), | - | 240 grains. |
| Citrate of Iron, | - - - | 192 grains. |
| Glycerin, | - - - | 1 fl. oz. |
| Tincture Fresh Orange Peel, | - | 1 fl. oz. |
| Tincture Cardamom Comp., | | 20 minims. |
| Sherry Wine, | - | enough to make, 16 fl. oz. |

Dissolve the peptone in water with the aid of heat and neutralize with a few drops of ammonia.

Dissolve the iron in a small quantity of hot water, then mix with the other ingredients and add the solution of beef peptone while still warm. If the wine has been detannated, there will be but a slight precipitate. Let stand three or four days and filter.

What the English Authorities think of Armour's Nutrient Wine of Beef-Peptide.

The English Inland Revenue authorities have granted a special indulgence for the sale of Armour's Nutrient Wine of Beef-Peptide, because, although we use high-class Sherry, it contains so much *real food* that it is to be regarded as a highly nourishing diet, and not as a wine.

This sufficiently marks the vast difference between our preparation and other Beef Wines, which are stimulants only.

MEDICAL PRESS OPINIONS ON Armour's Digestive Ferments and Nutrient Wine of Beef-Peptide.

The Lancet, November 14, 1891.

"According to the results of our experiments, the digestive ferments of Messrs. Armour's manufacture are to be assigned a place high up in the category of valuable alimentary products. We have received no less than three varieties of pepsin—amorphous, scale, and a solution in glycerine, pepsin glycerole—*every one of which furnished excellent results.* Each acted readily on hard white of egg, transforming it into soluble albumen and peptone.

"The pancreatin preparations acted similarly and with equal readiness on both albumen and starch."

"As a rule we are strictly loyal to the B. P., but in the matter of pepsin we should certainly not advise the use of the official article, so far does it fall below the activity of the Armour brand.

"Equally important and active are the various preparations of pancreatin which the same makers supply. This pancreatin is sent out either as a stable, odourless white powder of the pure substance, or in tablets combined with soda, one of which is sufficient to peptonize one half pint of milk."

evidence of the value of the preparation, inasmuch as it was found to be remarkably active in digesting hard boiled egg, which it readily converts into assimilable peptone.

“Notwithstanding its activity, this essence possesses a very satisfactory flavour and odour.”

“Armour’s Essence of Pepsin is a distinct advance on ordinary preparations of this class.”

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LONDON

