

THE  
COMPOSITION OF SOME PROPRIETARY  
DIETETIC PREPARATIONS.

I.

THE importance of the part played by diet in promoting health or causing disease has perhaps never been so widely recognized as at present; and although a vast field remains for researches into the intimate nature of foodstuffs and the exact changes they undergo in metabolism, a point has already been reached far beyond the empirical rules which governed medical regulation of diet at an earlier day. The process of preparing animal and vegetable materials for use as foods has been developed until the original materials are frequently no longer recognizable, and artificial foods are manufactured of heterogeneous materials in such a way as to secure the desired balance between the different constituents, either to furnish all the elements of a complete diet, or to produce a food suitable for use in various forms of illness.

As unfortunately too often happens, however, advancing knowledge has been applied not only to effect real improvements, but also sometimes for the skilful simulation of improvements so that it is of great importance to be able to discriminate among the large numbers of dietetic articles either manufactured or modified in their properties for a particular purpose, and to distinguish those which possess real merit from those which do not, or for which a price is charged which is out of proportion to their merits.

With a view to assisting in the formation of correct judgements in this matter, it is proposed to publish in the BRITISH MEDICAL JOURNAL the results of careful analysis of a number of dietetic preparations.

I.—MEAT WINES.

Results of the examination of certain meat wines will first be given. There are several much recommended by the makers as tonics, to be taken during convalescence and in conditions of debility, and there can be doubt that very considerable quantities of wines are consumed in this way. In order that the use of or abstinence from such a wine may be advised, the medical practitioner requires to have some knowledge of its alcoholic strength and of the proportion of meat extract or other meat preparation contained in it; in some cases other constituents, such as iron, malt extract, cinchona preparations, etc., are stated to be present, and the dosage of these also should be known; information as to the general nature of the wine is, of course, also useful. In the following paragraphs the results of calculation from the percentage composition are given, showing how much of each of the principal constituents is contained in a wineglassful of the wines in question; "a wineglassful" is taken to be 2 fl. oz., which is the measure conventionally recognized as its equivalent, although the actual size of wineglasses varies very greatly.

To facilitate comparison, the following short table of the average alcoholic strength of ordinary wines, with the amount of pure alcohol in a wineglassful of each, is given:

Wine.	Percentage of Alcohol by Volume.	Amount of Pure Alcohol in a Wineglass.
Port ... ..	20	3½ fluid drachms.
Sherry ... ..	20	3½ "
Champagne ... ..	10 to 15	1½ to 2 "
Hock ... ..	10	1½ "
Claret ... ..	9	1½ "

It is not possible, without a complex analysis of a very large quantity, to determine positively whether meat extract only, or some other meat preparation, is contained in a wine. In some instances the makers state that meat extract is added, while in others the same addition is implied; in other cases, again, such terms as "beef essence," "beef jelly," and "pure meatnourishment (not extractives)"

are used. The total nitrogen found has accordingly been calculated into its equivalent of meat extract, assuming the latter to contain 8.9 per cent. of nitrogen, which is the percentage found by analysis in a well-known brand of high-class meat extract. This introduces a small error in favour of the wine; natural wine contains a small proportion of nitrogen, which may be from 0.01 to 0.1 part per 100 fluid parts; as it is impossible to say how much was contained originally in the wine used in a given case, no correction has been made for this, but the whole of the nitrogen has been treated as derived from meat extract; this should, therefore, be borne in mind in judging of the results given. The acidity of the wines is expressed in the usual way, the fixed acid being calculated as tartaric, and the volatile acid, or that portion which is lost on boiling down the wine, as acetic acid.

BOVRIL WINE.

This is prepared by Bovril, Ltd., London, E.C. No price is marked on the bottle; the usual retail price appears to be about 1s. 3d. The bottle held 9½ fluid ounces.

It is described on the label as

A nutritive tonic containing the properties of "Bovril," Extract of Malt, and Selected Port Wine.

Directions.—"Half a wineglassful may be taken three times daily."

Analysis gave the following results:

Alcohol ... ..	20.15 per cent. by measure.
Total solids ... ..	13.2 parts per 100 fluid parts.
Meat extract (calculated from nitrogen)...	0.5 " "
Fixed acidity ... ..	0.34 " "
Volatile acidity ... ..	0.10 " "
Reducing sugar calculated as glucose ...	10.2 " "
Ash ... ..	0.3 " "

Glucose was identified by appropriate tests; a part of the sugar present may have been maltose, and if this were added as malt extract, as implied by the label, it would be accompanied by the nitrogenous constituents of the extract, and the whole of the nitrogen should then not be attributed to meat extract. According to this formula, a wineglassful would contain:

Pure alcohol ... ..	3½ fluid drachms.
Meat extract ... ..	4.4 grains.
Glucose ... ..	88.0 "

"LEMCO" WINE. LIEBIG'S EXTRACT OF MEAT AND MALT WINE.

This wine, prepared by Stephen Smith and Co., Ltd., Bow, London, E., is sold at the price of 1s. 9d. a bottle, containing 13½ fluid ounces.

Directions.—"A wine-glass full three times a day, children half the quantity."

Analysis gave the following results:

Alcohol ... ..	17.26 per cent. by measure.
Total solids ... ..	15.7 parts per 100 fluid parts.
Meat extract (calculated from nitrogen)...	0.6 " "
Fixed acidity ... ..	0.31 " "
Volatile acidity ... ..	0.12 " "
Reducing sugar calculated as glucose ...	12.8 " "
Salicylic acid ... ..	trace. " "
Ash ... ..	0.4 " "

Glucose was identified by appropriate tests. According to this formula, a wineglassful would contain—

Pure alcohol ... ..	2½ fluid drachms.
Meat extract ... ..	5.2 grains.
Glucose ... ..	112.0 "

COLEMAN'S WINCARNIS.

This wine, prepared by Coleman and Co., Limited, Wincarnis Works, Norwich, is sold in bottles, containing 12½ fl. oz., and costing 2s. 9d.

Directions.—"A small wineglassful may be taken three times a day."

It is described on the label as

Made from Choice Wine, Liebig's Extract of Meat, and Extract of Malt.

Analysis gave the following results:

Alcohol ... ..	19.6	per cent. by measure.
Total solids ... ..	20.9	parts in 100 fluid parts.
Meat extract (calculated from nitrogen) ... ..	1.2	" "
Fixed acidity ... ..	0.26	" "
Volatile acidity ... ..	0.09	" "
Reducing sugar calculated as glucose ... ..	18.2	" "
Ash ... ..	0.4	" "

Glucose was identified by appropriate tests; a part of the sugar may have been maltose, and if this were added as malt extract, as stated on the label, it would be accompanied by the nitrogenous constituents of the extract, and the whole of the nitrogen should not then be attributed to meat extract.

A second bottle which was examined contained only 18.1 parts of total solids in 100 fluid parts.

According to the above formula, a wineglassful would contain:

Pure alcohol ... ..	3 fluid drachms and 8 minims
Meat extract ... ..	10.5 grains
Glucose ... ..	159 "

#### GLENDENNING'S BEEF AND MALT WINE.

This is prepared by W. Glendenning and Sons, Limited, Newcastle-on-Tyne, and is sold at 2s. a bottle, containing 12 fl. oz.

Directions.—"A wineglassful may be taken twice a day with food or after."

It is described on the label as

Made from Alto Douro Port, Beef Jelly, and Malt Extract.

Analysis gave the following results:

Alcohol ... ..	20.8	per cent. by measure.
Total solids ... ..	13.5	parts in 100 fluid parts.
Meat extract (calculated from nitrogen) ... ..	0.4	" "
Fixed acidity ... ..	0.31	" "
Volatile acidity ... ..	0.09	" "
Reducing sugar calculated as glucose... ..	10.6	" "
Ash ... ..	0.3	" "

Glucose was identified by appropriate tests; a part of the sugar may have been maltose, and if this were added as malt extract, as stated on the label, it would be accompanied by the nitrogenous constituents of the extract, and the whole of the nitrogen should not then be attributed to meat extract. According to the above formula, a wineglassful would contain:

Pure alcohol ... ..	3½ fluid drachms.
Meat extract ... ..	3.5 grains.
Glucose ... ..	95 "

#### BENDLE'S MEAT-PORT NUTRIENT.

Two kinds of wine are supplied under this name by Sutton Bendle and Co., 148, Sloane Street, London, S.W. They are distinguished by a white and red capsule respectively, the latter being stated to contain twice as much "meat substance" as the former. The white capsule variety was taken for examination; no price is stated on the label, but the usual retail price appears to be about 3s. per bottle, containing 13½ fl. oz.

Directions.—"A wineglassful from three to six times a day."

This is described on the label as follows:—

A really genuine nutritive meat wine. Guaranteed to be made with the finest old tawny port (not tarragona), and to contain pure meat nourishment (not extractives) equivalent to seven per cent.

Analysis gave the following results:

Alcohol ... ..	20.3	per cent. by measure.
Total solids ... ..	10.9	parts in 100 fluid parts.
Meat extract (calculated from nitrogen) ... ..	2.5	" "
Fixed acidity ... ..	0.19	" "
Volatile acidity ... ..	0.03	" "
Reducing sugar calculated as glucose... ..	8.0	" "
Ash ... ..	0.5	" "

Glucose was identified by appropriate tests, and no evidence was obtained of the presence of any other sugar.

According to the above formula, a wineglassful would contain:

Pure alcohol ... ..	3½ fluid drachms.
Meat extract ... ..	22 grains.
Glucose ... ..	70 "

#### "BIVO." BURROUGHS, WELLCOME AND CO.'S BEEF AND IRON WINE.

This is prepared by Burroughs, Wellcome and Co., Snow Hill, E.C. No price is marked on the bottle or package or the contained circular, but the usual retail price is about 2s.; the bottle contained 8½ fl. oz.

Directions.—"One tablespoonful or more, plain or diluted with water, thrice daily for adults, or as ordered by the physician."

Analysis showed the wine to contain 19.2 per cent., by measure, of alcohol. A small proportion of the nitrogen present was found to be liberated as ammonia on treating with alkali, and this was therefore determined and deducted from the total nitrogen, only the remainder being calculated as meat extract. The results obtained were as follows:

Alcohol ... ..	19.2	per cent. by measure.
Total solids ... ..	17.7	parts per 100 fluid parts.
Meat extract (calculated from nitrogen) ... ..	3.4	" "
Fixed acidity ... ..	0.75	" "
Volatile acidity ... ..	0.06	" "
Iron ... ..	0.23	" "
Reducing sugar calculated as glucose... ..	11.5	" "
Salicylic acid ... ..	trace.	" "
Ash ... ..	1.2	" "

Glucose was identified by appropriate tests, and no evidence was obtained of the presence of any other sugar. According to this formula, a wineglassful would contain:

Pure alcohol ... ..	3 fluid drachms
Iron ... ..	2.0 grains
Meat extract ... ..	30 0 "
Glucose ... ..	100.0 "

#### "VIN REGNO." PEARSON'S LIEBIG'S BEEF WINE.

This is prepared by Liebig's Wine Co., Liverpool and London, and is sold at the price of 2s. 9d. a bottle, containing 13½ fl. oz.

Directions.—"Take a wineglassful three times a day and keep in a cool place."

On the label appear the words:

Chief Ingredients, Choice Port Wine, Essence of Beef, Malt Extract, and Quinine.

Analysis gave the following results:

Alcohol ... ..	16.05	per cent. by measure.
Total solids ... ..	13.45	parts per 100 fluid parts.
Meat extract (calculated from nitrogen) ... ..	0.3	" "
Fixed acidity ... ..	0.36	" "
Volatile acidity ... ..	0.12	" "
Reducing sugar calculated as glucose... ..	7.4	" "
Ash ... ..	0.3	" "
Alkaloid ... ..	slight trace.	" "

Glucose was identified by appropriate tests; a part of the sugar present may have been maltose, and if this were added as malt extract, as stated on the label, it would be accompanied by the nitrogenous constituents of the extract, and the whole of the nitrogen should then not be attributed to meat extract.

Only a slight trace of alkaloid was present. The quantity extracted from nearly half a pint of the wine was too small to be weighed or identified, and did not show even such a delicate test for quinine as the formation of a fluorescent solution. The wine had no bitter taste. According to the above formula, a wineglassful would contain:

Pure alcohol ... ..	2½ fluid drachms.
Meat extract ... ..	2.6 grains.
Glucose ... ..	65.0 "

#### SUMMARY.

Speaking generally, it will be seen that all the meat wines examined are stronger in alcohol than claret or hock, and approach the strength of sherry or port. With regard to the amount of meat extract contained, an ordinary good teaspoonful of extract of meat—such as would be used for a breakfastcupful of bouillon—weighs about 130 to 140 grains. The quantities of such a bouillon represented by one wineglassful of the wines described above would therefore vary from about 4 tablespoonfuls down to about 1½ teaspoonfuls.

The percentages of alcohol, sugar, and meat extract, and the amount of pure alcohol contained in a wineglassful, may be tabulated as follows:

Wine.	Alcohol by Volume.	Sugar by Weight.	Meat Extract by Weight, corresponding to Nitrogen Found.	Pure Alcohol in a Wine-glassful.
				Fl. Drachms.
Claret ... ..	9	0.25	—	1½
Hock ... ..	10	Trace	—	1½
Champagne(dry)	10 to 15	Trace to 2	—	1½ to 2
Sherry, dry ...	18	0.2	}	—
.. brown...	23	1.0		
Port ... ..	20	2 to 6	—	3½
Bovril ... ..	20.15	10.2	0.5	3½
Lemco ... ..	17.26	12.8	0.6	2½
Wincarnis ...	19.6	18.2	1.2	3
Glendenning's ..	20.8	10.6	0.4	3½
Bendle's ... ..	20.3	8.0	2.5	3½
Bivo ... ..	19.2	11.5	3.4	3
Vin Regno ...	16.05	7.4	0.3	2½

THE  
THERAPEUTIC APPLICATIONS  
OF RADIUM :  
METHODS AND RESULTS.

ALPHA RAYS.

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IN view of the fact that the feebly penetrating alpha rays possess at least ten times as much energy as the beta and gamma rays of radium together (Rutherford), it would be of great interest to know definitely whether they have ever been actually employed by medical men in their investigations. The alpha rays of radium are complex, and consist of four types, the most penetrating being absorbed by 3 in., and the least penetrating by 1½ in. of air and by other substances as a first approximation in proportion to their density in terms of that of air as unity. It will therefore at once be seen that it is an extremely difficult matter to employ any covering whatever over the surface of the radium salt if the alpha rays are to be effective. It is true that in France, by the use of certain varnishes, a very thin film of celluloid or collodion is used to cover the radium preparation, but in the absence of any definite physical tests proving that the alpha rays are able to get through this coating, the natural presumption would be that they were completely absorbed. This is one of the questions which it is to be hoped the new radium institutes will definitely and authoritatively deal with; that at Heidelberg specifically offers to medical men the co-operation of trained physicists.

Of the total radiation of radium about one-fourth—the least penetrating of the four types—of the alpha rays come from the radium itself, while the remaining three fourths of the alpha rays and the whole of the beta and gamma rays come from the spontaneously-formed products of the radium, of which the gaseous emanation is the first in the series. The emanation being a gas and directly concerned in the production of the greater part of the activity of the radium, it is in the highest degree essential that radium salts, after preparation in their final form, should be kept hermetically sealed from the air, as otherwise, by the escape of emanation, much of the activity of the preparation is lost. After being kept for three weeks in a closed vessel, radium attains its maximum, or, as it is also called, its equilibrium activity. Attempts to use the alpha rays, therefore, of necessity involve the risk of loss of emanation, and of the serious

weakening of the activity of the preparation, for no coating thin enough to allow alpha rays to penetrate is likely to be perfectly gas and water tight.

Recently, when asked to prepare a film of radium for a medical man, I abandoned the attempt to utilize the alpha rays, and covered the film with a piece of microscope cover-glass cemented into an ebonite cell. It must be remembered that one of the types of beta rays given by radium are relatively feebly penetrating, and a great saving in efficiency can be effected with a very thin covering even although no alpha rays escape.

The following notes may, however, be of assistance to any one wishing to make the attempt to utilize the alpha radiation.

The first consideration is that the radium salt must be uniformly distributed over as large a surface as possible, as otherwise the greater part of the alpha radiation is absorbed in the salt itself. Radium bromide and chloride undergo a spontaneous chemical change on being kept, part of the acid escaping, with formation first of the hydroxide, and ultimately of the carbonate, insoluble in water, by the action of the carbon dioxide of the air. So that to get the salt into solution a little pure hydrochloric acid should be added to pure distilled water, and two or three drops of this liquid used to dissolve the salt. On evaporation the radium salt remains usually in the form of large crystals, and this defeats the purpose of the operation. But if the whole of the liquid is first evaporated by warming the film on a hot plate and the salt is then redissolved in a drop or two of pure water a second evaporation yields without difficulty a fine homogeneous film of the salt.

As a rough test, to see whether any alpha radiation escapes absorption when the film is curved or coated in any way, one of F. H. Glen's translucent screens of glass thinly coated on the one side with zinc sulphide may be used. On bringing the base-coated side of the screen in the dark immediately over the curved radium preparation, and then alternately inserting and withdrawing a sheet of notepaper, some idea may be obtained, even from commercially prepared radium films, as to whether any alpha radiation is present, for the paper would entirely absorb alpha radiation while allowing the beta radiation to pass with little loss. If the insertion of the paper makes a great difference in the luminosity of the screen it may be inferred that alpha rays are present.

The best time, however, to perform this test is not before three hours after the radium salt is dissolved in water, and within this limit as soon as possible after the film has been got into its final form. At this stage the beta and gamma rays are at their minimum and may, for practical purposes, be neglected, while the residual alpha rays are those of the least penetrating type. Hence, if alpha rays get through when the preparation is tested at this stage it may be concluded that when the radium has recovered its normal equilibrium—after about three weeks—a very considerable proportion of the alpha rays will escape.

The therapeutic action of the alpha rays ought certainly to be tested once for all with a radium preparation from which it has been proved by physical tests that alpha rays can escape. But until this has been done, perhaps the best advice that can be given is that while a covering as thin as is consistent with gas tightness—such, for example, as microscope cover-glass—should certainly be employed, it is better not to risk impairing the activity of the preparation by using a covering pervious to the emanation in the hope, which may not be realized, of thereby utilizing the alpha radiation, which, again, may not be therapeutically effective or desirable.

RADIUM CONSIDERED AS A SPECIFIC  
AGENT.

[FROM OUR PARIS CORRESPONDENT.]

ONE of the most interesting points in the therapeutics of radium is most certainly its *specific* action. Drs. Wickham and Degrais, in their communication made to the Tenth Congress of French Medicine at Geneva on September 5th, 1906, defined "specificity" as the act by which radium transforms pathological cells and modifies morbid processes into healthy or new tissues no longer presenting any morbid character, and without the production at any