

**A short account of pancreatic emulsion and pancreatine prepared by Messrs. Savory & Moore / by Julius Schweitzer ; also, reports of cases by physicians and surgeons and extracts form books and periodicals.**

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A SHORT ACCOUNT  
OF  
PANCREATIC EMULSION  
AND  
PANCREATINE

PREPARED BY  
MESSRS. SAVORY & MOORE.

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BY  
JULIUS SCHWEITZER,  
OF BRIGHTON,  
*For many years Analyst and  
Practical Chemist with Messrs. Savory & Moore.*

ALSO  
Reports of Cases by Physicians and Surgeons,  
AND  
EXTRACTS FROM BOOKS AND PERIODICALS.

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A SHORT ACCOUNT

PANCREATIC EMULSION

PANCREATINE

MESSRS. SAVORY & MOORE

*Butler & Tanner,  
The Setwood Printing Works,  
Frome, and London.*

Reports of Cases by Physicians and Surgeons

EXTRACTS FROM BOOKS AND PAMPHLETS

LONDON:

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## ON PANCREATIC EMULSION AND PANCREATINE.

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THE increasing favour with which Pancreatic Emulsion and Pancreatine are received by the profession, and the great benefits derived from their use in phthisis and wasting diseases generally, induce me to place before the profession a brief history of these preparations.

In the following notes I shall principally confine myself to a notice of the discoveries in relation to the action of the pancreatic secretion on fats, and the therapeutical application of the facts made known. As early as 1832, the late Dr. Bright observed, that, in cases of disease of the pancreas, fat was passed from the body undigested. These observations were confirmed in other cases by Dr. Elliotson, Mr. Lloyd, and others, and hence it was inferred that the secretion of the pancreas performed an important part in the digestion of fats.

In 1834, Eberle first discovered that a liquid obtained by digesting the bruised gland in water, had the power of converting liquid fats into a kind of emulsion. Although several physiological experimenters had obtained what they regarded as the undiluted pancreatic secretion, by operations on living animals, this peculiar action on fats was not again observed, until the discovery was made by M. Bernard, in 1846. The operation by which that eminent physiologist procured that which he believed to be the normal secretion of the pancreas need not be described here. It differs somewhat from the means employed by other operators, and the fluid being obtained directly from the duct, it might appear to be better calculated to insure a good result.

It must be remarked here, however, that all physiologists agree in admitting that the pancreas is peculiarly susceptible to the influence of disturbing causes; and although no one experimenter seems to doubt that the fluid he obtained by a vivisection was the normal pancreatic juice, considerable differences are found in the descriptions of the fluids so procured.

Tiedemann and Gmelin describe the fluid which first flowed from the duct after an operation, as acid, and state that it afterwards became alkaline. Schultz found the secretion of the dog, cat, and horse, acid. Müller describes the secretion as acid. Majendie and Bernard agree in asserting that normal pancreatic juice is alkaline; and Corvisart states that it is generally if not always alkaline.

I have found in numerous trials on the pancreas of the pig within twenty-four hours after death, that a strip of litmus paper pressed against a freshly cut section of the gland, was almost invariably reddened. At the more extended and systematic series of experiments undertaken at the instance of Dr. Dobell, and which Messrs. Harris, of Calne, kindly enabled me to carry out at their establishment, the glands of forty pigs immediately after death gave the same result. The pigs were prepared for the experiment by being killed, some shortly after a full meal, and others at longer and longer intervals after food, so that the pancreatic secretion might represent that of the gland in full activity, or in perfect repose. In every instance, however, the substance of the gland had an acid reaction, which was not the case with the fat or muscles of the same animal.

As regards other characters of the pancreatic secretion, the descriptions of the different observers do not greatly differ. It is described by Bernard as a viscid opaline fluid, almost entirely coagulable by the application of heat. Frerichs, however, states that only an inconsiderable coagulum forms when this fluid is heated.

The addition of alcohol throws down a precipitate which can be collected and dried. It is then soluble in water, and the solution possesses all the active properties of the original pancreatic fluid.

The peculiar action of the pancreatic secretion on fats was, as we have said, first discovered by Eberle; but it has been most completely confirmed by the more extended researches of

Bernard, who has further demonstrated that it is the only one of the digestive fluids which possesses the power of forming a permanent emulsion with fats. As will presently be seen, Bernard fell into error in supposing that the fat so emulsified was decomposed or saponified, for which an alkaline secretion would seem to be necessary. No such saponification takes place out of the body, and there are no reasons for supposing that anything like it occurs in the natural process of digestion.

The power of converting starch into glucose, which the pancreatic secretion possesses in a far higher degree than the salivary fluid, was first observed by Valentin in 1844, who also found that cane sugar is likewise changed into glucose, the only form, it would seem, in which sugar can be absorbed and used by the animal economy.

The general action of the pancreatic juice on nitrogenized foods and other matters, has been fully described by Corvisart, who has shown that it possesses an active digestive power on all aliments similar to, and on some substances surpassing, that of the gastric juice. These investigations lie beyond my present purpose.

The foregoing sketch I believe fairly represents the state of our knowledge respecting the action of the pancreatic secretion on fats, up to the period when Dr. Dobell commenced his researches on the subject; and it is to be remarked that, up to that time, no therapeutical application had been made of the facts recorded.

By a long series of observations, and a process of inductive reasoning, that physician arrived at the conclusion that in tubercular disease there is a defective action of the pancreas on fats, and particularly on solid fats, and thus was led to study the action of the secretion; first, with the view to determine its exact character and nature; and secondly, to find some means of obtaining and preserving the active principles of the pancreas in a form suitable for administration as a remedial agent. These experiments were carried on in Messrs. Savory & Moore's laboratory, in Bond Street; some of the first being directed towards obtaining a permanent emulsion for medical use. When a solid fat, lard or suet for example, is treated with the crushed pancreas, an emulsion is quickly formed which can be separated from the crushed gland

by straining through muslin. The secretion of the pancreas however is peculiarly prone to decomposition, and such an emulsion quickly acquires an offensive odour. The experiment of extracting the pancreatized fat with ether was therefore tried, and the remarkable discovery was made that the fat so extracted readily mixes with water, and forms a permanent emulsion of uniform strength, which has no tendency to putrify, and can be preserved for an indefinite time. The nature of the change produced in the fat by the action of the pancreas has been investigated both microscopically and chemically.

When pure lard is examined with the microscope, it is seen to consist of "aggregations of acicular crystals." In the case of lard which has been submitted to the action of the pancreas, these aggregations of crystals will be found completely broken up, and minute crystals will be seen uniformly distributed among fine granular matter.

The crude emulsion, when treated with ether, leaves a watery residuum. If, by the action of the pancreas on fat, the latter were really saponified, the glycerine, necessarily set free, would be found in this liquor. On examining it, however, no trace of glycerine can be found. But to be certain that no saponification takes place, the pancreatized lard, extracted by ether, was treated with oxide of lead, when it was found that lead soap was formed with the consequent separation of glycerine. It is thus seen that no chemical decomposition of the fat is produced by the action of the pancreas, and that the only alteration it undergoes, is a molecular change, accompanied by the absorption, and perhaps combination, of a little water. That moisture is absorbed, is proved by a small increase of weight in the fat; and by the fact that when the pancreatized lard is heated for some time to  $212^{\circ}$  F., the lard is reduced in weight, and also to its original condition, having lost its emulsifying property. While thus completely confirming the results of Eberle and Bernard, as to the emulsifying property of the pancreatic fluid, Dr. Dobell's investigations have led to the extension of our knowledge of the action of that secretion, by showing that the change it effects on fats (out of the body at all events), is simply a molecular alteration, attended by the absorption, and probably a loose but uniform combination, of a little water. That the fat is thereby prepared for absorption

by the lacteals there can be no doubt, and it must be accepted that one special function of the pancreas in the natural process of digestion, is the emulsification of fats as a preliminary step to their absorption:

It must be added, that the emulsion formed by the agency of the pancreas, differs from all others, formed by chemical or mechanical means, in this circumstance, that it is not destroyed by ether. From all others, ether separates the fat in its original condition. In this case, however, it readily mixes with water again; and although it seems but little changed in appearance, it has really undergone a remarkable alteration. It is unnecessary for me to say anything of the action of the pancreatic fluid on starch, sugar, and other matters, since my experiments offer nothing of novelty.

The preservation of the active principle of the pancreatic secretion for administration as a remedy, apart from the emulsion, has occupied a good deal of my attention. Like pepsine, pancreatine is a highly albuminous body, soluble in water, insoluble in alcohol and ether. From its watery solution it may be precipitated by salts of lead or mercury, and by subsequent decomposition of these precipitates obtained in a state of purity. It is a highly hygroscopic body which speedily undergoes decomposition, and for practical application, or as an article of commerce, could not be used in its greatest state of purity. Like pepsine, to effect its ready and effectual dessication, it has to be mixed with a drying absorbent medium, such as malt-flour, sugar of milk, etc. The powder so mixed and dried will keep for an indefinite period, and is called by the name, Pancreatine.

# REPORTS OF CASES

## TREATED WITH

# PANCREATIC EMULSION;

EXTRACTS FROM BOOKS AND PERIODICALS.

ETC., ETC.

Some idea of the advantages to be derived from Pancreatic Emulsion may be gathered from the following extracts from published works, journals, etc.

*From the LANCET, Sept. 10, 1864; June 10, 1865;  
Nov. 11, 18, 1865; and Nov. 17, 1866.*

REPORTS OF CASES TREATED WITH PANCREATIC EMULSION AT  
THE ROYAL HOSPITAL FOR DISEASES OF THE CHEST.

CASE 1. Has tried oil, and it "won't keep down." Emulsion agrees well; and at the fourth week he says, "I never had anything to do me so much good in my life." Appetite good while taking it.

3. Has taken oil three months, with slight increase in flesh, and it agrees; but chest symptoms are getting worse. Emulsion agrees well; he says "It's very nice." After fourteen days, very much improved in all respects.

4. Has been taking oil and tonics, but loses flesh and strength, and gets rapidly worse; appetite is destroyed while taking oil, but she is so convinced of the importance of taking it, that it is difficult to persuade her to take emulsion instead. Emulsion agrees. On third week, she says she "gets on wonderfully:" and on fourth, that she "eats till she is ashamed of herself." On fourth week, excessive craving gone; appetite regular and good; gaining strength rapidly.

5. Oil produces constant nausea, but does not rise. Emulsion agrees well; does not leave nausea, like the oil. At fourth week, oil tried again, but it produces nausea; obliged to return to emulsion.

6. Oil produces nausea, and, after a week or two, cannot be kept down—has often been tried; can't take any sort

of fat. Emulsion agrees well; appetite improves while taking it, and the frequent bilious feelings to which he was subject have disappeared. At fourth week, enjoys fat; and can now take cod-liver oil, as well as emulsion, without nausea.

7. Cannot be induced to take oil, dislikes it so much. Emulsion agrees; never rises, and is taken with ease. At third week, says flesh gets firmer.

8. Oil agreed formerly, and did good, but for the last twelve months it has disagreed more and more, and for some time past will not keep down at all. Emulsion agrees, no nausea produced. At fourth week, appetite is improved, especially for meat; says he "feels quite a different man."

9. Has taken oil six months, but it spoils appetite, and he loses flesh and strength. Emulsion agrees: he likes it. At fourth week, appetite is very good; is able to take suet with pleasure, and says he could take more emulsion, if allowed.

10. Four years ago took cod-liver oil with advantage, but of late it rises, and brings up the food with it. The first two doses of emulsion rose, but it afterwards agreed, and is now liked. At fourth week, cod oil tried again, but "won't keep down." Emulsion resumed, and agrees; appetite good; enjoys meat while taking emulsion.

11. Cod oil agreed last winter, but now it "won't keep down." Emulsion agrees well. At fourth week oil tried again, but still "won't keep down." Emulsion resumed, and taken six weeks with pleasure.

12. He has tried cod oil, but "can't take it." Emulsion agrees well; appetite for meat improved.

13. Oil tried two months ago, and also this week, but he brings up his food while taking oil, and loses ground fast. Emulsion agrees; gains flesh and strength. After taking emulsion five weeks, can take two ounces of oil and emulsion as well.

14. When he began emulsion, appetite was very bad, and it was difficult to take the milk with emulsion; but appetite improved as he went on, and he took emulsion twenty weeks with great advantage, buying it for himself after his discharge, because he missed it when it was discontinued.

15. After taking oil for a long while and losing flesh and strength, he gained 8 lbs. in seven weeks under emulsion, and got quite strong.

16. Had taken oil off and on for twelve months, but steadily lost flesh and strength. Of late oil has disagreed, and motions are pale. Emulsion agrees; appetite improves, and she gains flesh and strength rapidly; motions no longer pale.

17. Advanced third stage. Had taken cod-liver oil for three months, but it disagreed latterly, and she had steadily lost ground in all respects. Emulsion agrees well, and after a fortnight she is surprised at her improvement. At the fourth week she writes: "I gain strength daily. Appetite much improved. I have not such a dislike to fat, and I now can take cod-liver oil as well as emulsion."

18. Oil makes him sick. Emulsion keeps down, when nothing else will; appetite improves, and he gains flesh, says he is much stouter and stronger.

19. Has been ill seven years; is now in the third stage. Has taken cod-liver oil, and he says it agrees and does more good than anything else; but still he gets worse and worse, losing flesh and strength fast. He likes emulsion, and at eighth week he does not lose flesh, and says he feels firmer; appetite better. At twelfth week he still gains ground. Ordered to take cod oil as well as emulsion.

20. Cod-liver oil agreed last winter, but now won't keep down. Emulsion agrees well.

21. Has been taking cod-liver oil freely, but it does no good; loses flesh, appetite, and strength. Emulsion agrees well. At sixth week has gained flesh and strength; appetite good.

22. Neither cod-liver oil, suet and milk, milk nor eggs will keep down. Emulsion agrees, keeps down, creates appetite for meat; can take milk with the emulsion.

23. Oil agreed until lately; now it causes sickness and destroys appetite. Emulsion agrees; she likes it; appetite improves; she feels less sinking. At sixth week she feels herself quite well.

24. Oil has been taken five weeks with no good effect, and now it won't keep down. Emulsion agrees; he says he "feels support from it;" appetite improves, and he gains flesh and good looks.

28. Oil won't keep down. Emulsion agrees and makes her "feel stronger inside."

25. Oil keeps down, but passes off by the bowels. Emulsion agrees, and does not pass off by the bowels.

26. Oil comes up as fast as it goes down. Emulsion agrees well. At sixth week discharged much improved.

27. Oil won't keep down, though tried many times; it produces violent sickness. Suet and milk without emulsion kept down, but caused "dreadful feeling of sickness." Emulsion of suet in milk keeps down, and produces no feeling of sickness; appetite improves. Discharged, at twelfth week, very much improved in all respects. After four weeks comes back to beg for more emulsion, saying she cannot live without it. A fortnight after this says, emulsion agrees, "keeps down the food and keeps off sickness."

28. Physical signs of consumption not very marked, but general condition very bad; great prostration and sweating; very troublesome cough. Has had much tonic treatment and cod-liver oil, but has not found anything do good. Emulsion agrees. After fourth week is remarkably improved; says he feels a great vacancy when he does not take the emulsion.

97. After taking emulsion eight weeks, appears to be quite well, and declares that he is.

105. Eight brothers and sisters died of consumption, also father and several of his family. Cod oil has never seemed to do good. Emulsion agreed, and patient improved much.

122. Says emulsion does great good; he gained 8 lbs. more weight than he ever weighed before. No morbid chest-sounds left.

132. Has lost 20 lbs. in eighteen months, though taking cod-liver oil. Oil and emulsion both agree; likes emulsion best. Discharged himself in five weeks—he "felt himself so much improved."

134. Constant craving for food; no satisfaction from eating. Terrible flatulence. After taking emulsion seven weeks, lost craving for food; appetite natural; gained flesh; altogether better than for twelve months.

137. Oil disagrees. Likes emulsion much. At seventh week appears well.

145. Says emulsion does much good; eats with appetite; and whereas he was rapidly losing flesh and strength, is now gaining both. At eighth week nothing to complain of.

146. Emulsion agrees well. After fourth week, instead of losing flesh as before, has gained much, and feels quite well.

148. Had been losing flesh, spitting and coughing, twelve months. After emulsion eight weeks, apparently well.

154. Says emulsion agrees exceedingly well; makes him feel quite different. At fourth week, extraordinary improvement in appearance; says he has lost cough, eats well, and is jolly.

172. Child of seven years. No appetite; sick with food. Emulsion agrees. At third week mother says she is wonderfully improved in so short a time; not sick; appetite good: nothing the matter.

175. Improved so much under emulsion that she asks to have double quantity.

94. Oil agreed four months ago; now will not keep down. Emulsion agrees, likes it much better than oil. Appetite improves; gets much stronger.

102. Has taken cod oil without benefit; it disagrees. Emulsion agrees; sleeps, eats, and feels better; loss of flesh stopped.

103. Sick with everything but emulsion; it keeps down, and she feels better while taking it regularly.

117. Took oil without improvement. Took emulsion and improved much.

119. Wonderfully improved under emulsion. Walks now four miles a day; before could hardly walk from exhaustion.

123. Has taken oil thirteen months, losing flesh and strength all the time. Now sick: oil and food both come up. Emulsion agrees; sickness stopped; gains strength.

124. No appetite; all food passes through bowels directly. After four weeks' emulsion, appetite good; food does not pass as before; complained much of missing it when the quantity of emulsion ran short.

125. Took oil five weeks; got much worse; it now produces sickness immediately. Emulsion agrees; says he could take a good deal of it. Appetite improves: general condition better.

126. Oil agreed once; now comes up. Appetite bad; loses flesh. Emulsion agrees. Appetite improves; gains flesh. At twelfth week considers herself quite well.

130. Takes oil, but gets worse and worse. Emulsion agrees; at eighth week not losing flesh, and is much improved.

135. Oil spoils appetite. Emulsion improves it.

157. Oil rises; always ill after it. Likes emulsion; asks for double quantity. At sixteenth week has gained flesh and strength; feels well.

160. Oil agreed six months ago, now produces sickness; feels constant craving and sinking, not relieved by taking food; food comes up. Emulsion agrees; food does not come up; stomach feels stayed; picks up flesh.

165. Says emulsion relieves wonderfully; it revives, soothes, and strengthens. At eleventh week no cough: feels well.

168. Says nothing does good like the emulsion.

96. Emulsion increases appetite wonderfully; on leaving it off, appetite fails. At sixteenth week very much improved. Menstruated first time for many months.

101. Says emulsion agrees first-rate. While under treatment, all moist sounds cleared up.

108. After five weeks' emulsion, discharged much improved; soon came back asking for emulsion, she missed it very much. Oil disagreed.

113. Has taken oil eight months, but lost ground steadily. Likes emulsion very much; misses it much if without it: gains strength and flesh, and improves altogether while he takes it regularly.

115. Oil comes up. Emulsion keeps down; says it does him much good; gained seven pounds in four weeks; appetite improved. At seventh week all moist sounds cleared up.

116. Liked fat till ill; cannot take it now. Emulsion agrees; appetite improved; enjoys meals now.

127. Had lost much flesh while taking oil. Emulsion gained four pounds first eight weeks, three the next two.

129. While taking oil alone, has no appetite. When he takes emulsion as well, appetite returns.

131. Larynx much affected; much diarrhoea. Emulsion agrees; gains flesh, appetite, and strength. After taking emulsion fourteen weeks, is able to go to work the first time for twelve months.

133. Oil rises. Emulsion agrees; asks to have more; gains flesh and strength.

143. Appetite good. Says he has a fearful job to keep down oil. Emulsion twice a day; is all right: fancies it does much good.

153. Has taken oil seven months; agrees, but does no good. Likes emulsion much better than oil. At eighth week has gained weight and improved in all respects.

159. Has taken lots of oil, but gets worse and worse

Likes emulsion ; it stays sense of sinking. At eleventh week considers herself well, and wishes to be discharged.

161. A very advanced case. The only thing that would stay on the stomach for many weeks before death was emulsion, which she took to the last ; and her friends and medical man thought she must have died many weeks sooner but for emulsion.

163. Oil agreed twelve months ago ; comes up now. Emulsion agrees ; stays on stomach. While taking, diarrhoea ceases ; comes on when without emulsion.

173. Emulsion stays stomach, and gives more feeling of support than oil.

176. Has taken lots of oil ; it agrees, but gets worse while taking it. Likes emulsion ; gains flesh and strength while taking it: Discharged at twenty-fourth week, improved in all respects ; looks well, and appetite good.

185. A very severe and chronic case. Long used to take oil. Objected much to try emulsion or anything but oil. After trying emulsion a few weeks, found so much more good than from oil, that as often as her letter ran out, she came back to hospital again and again for emulsion.

I have now reported the results of 187 carefully watched cases ; and the sum of the whole series, which has extended over about three years, is as follows :—

In the first stage (advanced) 45 cases ; second stage, 69, third stage, 73. Condition on discharge measured by general symptoms: Improved, 158 ; stationary, 8 ; worse, 18 ; not noted, 3. Measured by physical signs: Improved, 118 ; stationary, 46 ; worse, 18 ; not noted, 5.

Emulsion agreed, 180 ; disagreed, 7.

Cod-liver oil agreed, 75 ; disagreed, 98 ; not tried, 14.

“ MESSRS. SAVORY & MOORE have succeeded in perfecting a process by which A PURE PANCREATIC EMULSION can be produced, OF UNIFORM QUALITY, WHICH WILL KEEP GOOD FOR ANY REASONABLE LENGTH OF TIME.

“ It is the best to give the dose as nearly as possible two hours after a full meal, such as breakfast or dinner, particularly avoiding a long interval, and also avoiding warm drinks for two or three hours afterwards. When cod-liver oil agrees, a table spoonful of oil may be given directly after breakfast, to supply olein

to the blood through the portal system ; and a table-spoonful of emulsion in a cup of milk or water two hours after dinner, to supply the blood with pancreatized solid fats through the lacteal system. If cod-liver oil cannot be taken, the emulsion should be given two hours after breakfast and two hours after dinner.

“In the very few cases in which the stomach does not easily tolerate the emulsion, an alkaline powder of soda and calumba, or an effervescing draught of citrate of soda and potass, given before the meal which precedes the dose of emulsion, has generally overcome the difficulty. It must be borne in mind that some adults cannot digest milk, and in these cases the emulsion should be mixed with water instead. Brandy or rum may be added to the milk, or a glass of ginger wine to the water, with advantage in any case, if preferred.”

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*From the Cantor Lectures at the Society of Arts, Jan. 27, 1868, by DR. LETHEBY, Medical Officer of Health and Food Analyst to City of London, etc., etc.*

“*Pancreatic fluid* is a secretion from the pancreas or sweetbread. Until recently its true digestive functions were not well determined. It is a colourless fluid of a gravity of 1008 or 1009. Like the saliva, it is generally a little alkaline, and it contains about 1·3 per cent. of solid matter, one eighth of which is a nitrogenous organic substance of the nature of ptyalin or diastase, and is called *pancreatin*.

“More than twenty years ago, Bernard proved what Valentin had long before suspected, that the pancreatic fluid was concerned in the digestion of fatty matters ; but he fell into error in supposing that its action was to saponify the fat, and to set free glycerin. Here is a specimen of glycerin and of lead-soap, obtained from fat upon which the pancreatic fluid had previously acted, showing that saponification had not been effected. The true action of the pancreatic secretion is evidently to break up the large granules and crystals and globules of oil and fat, into myriads of minute particles of from 1-3000th to 1-15000th of an inch in diameter. In this way the fat is emulsified, and converted into a milky liquid, which mixes freely with water, and passes from the intestines into the lacteals. We are indebted for this knowledge to Dr. Dobell, who, with the assistance of Mr. Julius Schweitzer, the practical chemist

managing the laboratory of Messrs. Savory & Moore, of New Bond Street, made a large series of investigations into the properties of the pancreatic fluid. Dr. Dobell had long been of opinion that its functions were important in certain diseases, and required elucidation. When the fresh pancreas (and best of the pig) is rubbed down in a mortar with twice its weight of hogs' lard, it rapidly emulsifies it; and on adding about four or five times the bulk of water, and straining through muslin, there is obtained a thick, milky liquid of the consistence of cream, which gradually consolidates. If this be treated when the ether is separated by distillation, there remains the purified pancreatised fat, which is still miscible with water; in fact, when mixed with four or five parts of water it forms the creamy emulsion which is used dietetically and medicinally in doses of a teaspoonful at a time.

“The properties of the pancreatic fluid have been well described by Dr. Dobell in a paper recently read before the Royal Society of London; and it would seem that the fluid has not only the remarkable property of emulsifying oil and fat, and so rendering them capable of absorption, but it has also the power of dissolving starch by converting it into glucose. In this respect its action is like that of saliva, but it is much more energetic; for, in its fresh state, one part of the pancreas will dissolve eight parts of starch, and even after it has emulsified fat it will dissolve two parts of starch. It is, therefore, a powerful agent of digestion, in so far as fat and starch and young cellulose are concerned, but it has little or no action on albuminous substances.”

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*From the CHEMIST AND DRUGGIST, Jan. 15, 1866.*

“OF all the new remedial agents which are now being employed by the medical profession, the Pancreatic Emulsions, introduced by Dr. Dobell, are perhaps the most noteworthy. Some time must elapse before their real value can be established; but the satisfactory results which have already been obtained with them in the treatment of consumption, will induce all physicians who keep pace with the age to give them a fair trial. Should they prove as useful as Dr. Dobell believes them to be, their introduction will be referred to with delight by those who maintain that medicine can make but little progress until thera-

peutics and physiology are more firmly united. The pancreatic emulsions are rational remedies, and were devised to counteract the wasting effects of a morbid condition which Dr. Dobell detected in consumptive patients. Some years ago, Dr. Dobell's attention was directed to the fact, that many consumptive patients disliked fat, and the results of a careful examination of a series of cases which came under his notice at the Royal Hospital for Diseases of the Chest, proved that this dislike for fat was common to the great majority. These results closely corresponded with those published by Mr. Jonathan Hutchinson, in a valuable suggestive paper, "On the form of Dyspepsia which often precedes and attends Phthisis." With a view of testing by direct experiment, whether this dislike for fat was due to some abnormal condition of the pancreatic secretion, Dr. Dobell determined to treat a series of cases of consumption with the pancreatic juice of the pig. After many tedious experiments, in which he was assisted by Mr. Heathorn, a rising young chemist, an emulsion of beef-fat, with the pancreatic juice, was adopted as the most eligible preparation. This was supplied to the patients, who were ordered to take it stirred in milk. The emulsion could be mixed readily with the milk, and, in the proportion of half an ounce to a breakfast-cupful of milk, formed a drink that was not unpleasant. Twenty-four patients of the thirty-three treated with the emulsion were discharged after eight weeks, in an improved condition with respect to their general symptoms. The emulsion disagreed with three patients only, whereas cod-liver oil disagreed with eleven out of the twenty-four to whom it was administered. A second series of cases were afterwards treated with the pancreatic emulsion of fat, or with a pancreatic emulsion of lard oil, and similar satisfactory results were obtained. Mr. Heathorn being prevented by his other engagements from preparing the emulsions in sufficient quantity to meet the increased demand produced by many medical men prescribing them, Dr. Dobell sought and obtained the valuable assistance of Messrs. Savory & Moore, of New Bond Street, and these preparations are now made by this celebrated firm, under the direction and supervision of their scientific chemist, Mr. Julius Schweitzer. The principal preparations are: 1. Pancreatic emulsion of solid fat. 2. Pancreatic emulsion of cod-liver oil.

3. Pancreatic emulsion of lard-oil. The first of these appears to be the favourite remedy with the medical profession. It is a white paste of the consistence of thick Devonshire cream. It remains good for a long time, though the pancreatic juice, un-mixed with fat, rapidly undergoes decomposition. The dose is from one to three teaspoonfuls, once or twice a day, in a cup of milk, to which a little brandy may be added. It is to be taken two hours after a full meal. A fourth preparation, recommended by Dr. Dobell, is Pancreatine.

“According to Claude Bernard, the great French physiologist, the pancreatic juice is the most important secretion of the digestive organs, and possesses the property of emulsifying fats, of transforming starch into sugar, and of acting on albuminous substances. Some physiologists do not adopt Bernard’s view, but all agree that the pancreatic juice helps to render fats easy of absorption.

“The following extracts from one of Dr. Dobell’s reports will show the value of any means for promoting the assimilation of fat in consumptive patients, and also explain the frequent failure of cod-liver oil to sustain the improved condition which so often occurs when it is first administered:—According to the careful estimate of Dr. Lyon Playfair, the quantity of fat required by an adult in twenty-four hours, to keep up healthy nutrition, is from 1 oz. to 2·5 oz.; and according to the estimates made from numerous and carefully selected data by Mr. Farrants and myself, the quantity is from 2 oz. to 3·5 oz. We may fairly assume, then, that not less than two ounces of fat per day, on an average, is required to keep up healthy nutrition in an adult. We have next to bear in mind that, before a case of consumption ordinarily attracts attention, and begins to be treated as such, many pounds’ weight, principally consisting of fat, have been gradually removed from the body. In this condition—1, a deficiency of fat throughout the organism; 2, a loss of the power to assimilate ordinary fats; 3, a constant demand for two ounces per day, to maintain the healthy nutrition, we administer cod-liver oil, in the belief that this form of fat will assimilate when other forms will not. Supposing that it agrees, and that some or all of it is utilized, a rapid improvement takes place in the patient, from the supply of some of that for want of which life was steadily fading—very much as a cut flower,

that has drooped for want of its supply of sap, rallies and recovers freshness for a time when put into water. But there are very few persons who can take more than half an ounce to one ounce of oil per day—few who can even take this steadily from week to week without intermission. But supposing an ounce or an ounce and a half per day to be taken regularly, how is this to supply, not only the two ounces per day required for healthy nutrition, but all the extra ounces of arrears that were lost before the treatment was begun? But assuming the possibility of two ounces per day of oil for nutrition, and another two ounces for arrears, being taken and utilized, even then the whole thing may be unstable and break down, from the fact that we are supplying oil and not solid fat—a body rich in olein and poor in stearin and margarin—in the place of bodies rich in stearin and margarin and poor in olein, such as the fats taken in normal food.

“The practical conclusion from these considerations appears to be, that if we are to give a fair chance of recovery to a patient deprived of the natural powers of digesting and assimilating fats, we must, by one means or another, secure that two ounces of fat of average solidity are utilized every day for the purposes of nutrition, and an additional ounce or two to make up for arrears.

“If the pancreatic juice of the pig artificially introduced into the digestive apparatus does really cause a fair proportion of this amount of fat to be assimilated, the pig’s ‘sweetbread’ must be regarded as one of the most important articles of the *Materia Medica*. B.”

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*From the ATHENÆUM, May 26th, 1866.*

“THE views on the nature and treatment of tubercle of the lungs, contained in this little volume, have long been before the public, and the result has been that the conclusions of Dr. Dobell, are generally regarded as sound. He shows, that in those states of the system known as scrofula and consumption, there exists a defective action of the pancreas, and that, consequently, the fat taken in food is not properly digested and carried to the nutrition of the body. The consequence is, those deposits in the body known by the name of tubercles. The result of Dr. Dobell’s researches is, that he recommends

the administration of fatty foods, which have been submitted to the action of the pancreatic juice of other animals. From time to time, Dr. Dobell has published cases treated successfully on this plan, and in this volume he has given a full account of his views, and the cures which support them. To say that Dr. Dobell has discovered the true pathology of tubercle, and the means of its cure, would be premature ; but we think that he has made out a case which claims the serious consideration of all medical men."

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*From the* BRITISH AND FOREIGN MEDICAL CHIRURGICAL  
REVIEW, *January, 1867.*

"THESE cases support the proposition, that pancreatic emulsion of solid fat, may be most advantageously given in phthisis. It, moreover, appears to possess the advantage of agreeing with the patient, when cod-liver oil does not. Dr. Dobell's favourable experience of the remedy is such as to make it worthy of trial by others, and we trust that it may be fairly tested by the profession."

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*From the* DUBLIN QUARTERLY JOURNAL OF MEDICAL  
SCIENCE, *Nov., 1867.*

"PANCREATIC emulsion, as every one now knows, was originated by Dr. Dobell. . . . We have not had much experience of its use, but within the past few days, we happened to see a young lady who has been taking it for months, and while doing so, she has been changed from a thin, nervous, desponding creature, into a plump, tolerably robust, and cheerful woman."

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*From "The Indigestions or Diseases of the Digestive Organs functionally treated." By* THOMAS KING CHAMBERS, M.D.,  
*Hon. Physician to H. R. H. The Prince of Wales, etc., etc.*

"By the artificial emulsion of fat with pancreatic juice, we certainly seem to be put in possession of an easily assimilated oleaginous material, and a most valuable contribution to the restorative pharmacopœia.

"Dr. Dobell has used it more extensively than anybody else, and he is convinced of its superiority to cod-liver oil in consumption. Medical men should warn patients to be careful whom they get it from.

“The experiments of Drs. Bidder and Schmidt, and of their pupil Lenz, have indeed deposed the pancreas from the position in which it was placed by Bernard, as almost the sole actor in the digestion of fatty substances; but yet it still remains as an important link in the chain of physiological agencies conducing to that digestion. And it is fortunately one which we are able to supply by artificial means. As to the form of preparation, it is much more practically convenient to give (as it is done in the emulsion) the digester and the article to be digested at the same time, than to divide them, as in the proposal to administer “pancreatine” prepared after the fashion of pepsine. In point of fact, it is probable that the activity of the pancreatine would be entirely obliterated in its passage through the stomach, unless it were guarded by the fat, with which it is already united. It is the fat that is wanted, and this is an easily assimilated form of it.

“That the pancreas is an important agent in the digestion of fat, receives powerful support from a class of fatal cases in which the whole of the pancreas is organically altered in structure, and in which, during life, a peculiar inaptitude to digest adipose tissue has been observed. I shall revert to this subject in illustrating, in a future chapter, organic changes in the digestive viscera.”

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*From “Diseases of the Lungs and Air Passages.” By DR. FULLER, Sen. Physician to St. George’s Hospital. Second Edition.*

“THESE are cases in which the utility of pancreatine does not admit of doubt.

“The repugnance of fatty and oleaginous matters exhibited by some consumptive patients is so great that they cannot be induced to take them; and even if they do swallow them, they either eject them by vomiting, or find their digestive organs completely upset, and in these cases, the pancreatic emulsion is useful in supplying an important element of food, in a form in which the digestive organs can deal with it.”

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*From DR. DOBELL’S work on “Tuberculosis.”*

“A REMARKABLE case of recovery has just come to my notice, in which the emulsion appears to have played an important part.

“A gentleman consulted me in March last (1865), of whom I made the following note:—Aged thirty; losing flesh fast; getting very weak; sweats much; appetite moderate; cannot touch fat. Cough troublesome all day, and also in the night; now and then the fits end in vomiting; much expectoration, occasionally tinged with blood. Has had a cough for three winters, with bronchitis and frequent catarrh; but has every appearance, now, of rapid phthisis. Chest very thin; supra and infra-clavicular spaces hollow. Left upper lobe dull in front; breathing harsh; expiration long and harsh; no moist sounds. Right upper lobe dull behind; breathing very harsh, especially expiration; no moist sounds; other parts normal. He had been long under treatment for his cough and weakness without benefit, and was fast getting worse. I ordered the pancreatic emulsion of suet, and some other treatment; but at the end of a week he had not improved, and found some difficulty in taking the emulsion. His friends came to me about him in great anxiety, as he seemed to be rapidly sinking. I advised his removal to the south coast, and that, if possible, he should go on with the emulsion. With some difficulty, in consequence of his weakness, this advice was followed. At the end of a week he wrote me that he was now able to take the emulsion once a day, but that he felt getting worse instead of better; and his friends called and reported that they had seen him, and thought he could not possibly recover. I advised that he should put himself under a doctor in the place where he was, who could communicate with me. From this time I heard no more of him; and about a month afterwards filled up my note of his case thus: ‘From the last reports I fear that he sank rapidly and died.’ To my great surprise, however, he called upon me last week (Oct. 10th), looking the picture of health, so stout and strong that I did not at first recognise him. He told me that when my last message reached him he was just beginning to mend, and, therefore, did not send for the local doctor; that he had been wandering about the south coast from place to place, and had taken the emulsion once or twice a day regularly for twenty-eight weeks, with no other medical treatment. On examining his chest, I found the physical signs unchanged since my first note; the dulness and harsh breathing remained, but no moist sounds and no cavities. His own idea was that

his recovery was mainly due to the emulsion, because he had found that he missed it so much when he had once or twice been prevented from taking it by the delay of his parcel from London.

“July 25th, 1865.—I was consulted about a little girl aged thirteen, chiefly for an opinion as to whether anything more could be done to prolong life. She had been under treatment for several years for scrofulous disease of the right knee, and during that time had taken much cod-liver oil and tonics, from which her general health had been often benefited; the knee had got worse and worse, and all hope of saving the limb had been abandoned for about twelve months by several leading surgeons, and amputation decided on. But the child's health had so completely broken down, and consumption so unmistakably set in, that after some fruitless attempts to recover her strength, the idea of operating had also been abandoned. When I saw her, she was very thin, careworn and haggard, with hectic flush, loss of appetite, severe night-sweats, constant cough, and considerable expectoration; the upper part of the right lung partially dull, breathing harsh; upper half of the left lung dull, copious crepitation and bronchophony back and front; the pulse feeble and rapid. I found that she had been steadily taking a tablespoonful of cod-liver oil twice a day for two months, but losing flesh and strength all the time. As a last resource, I ordered the oil to be taken once instead of twice, and the pancreatic emulsion of suet once.

“Oct. 17th, 1865.—I was again requested to see the child for the purpose of saying whether she might now have the operation performed, as her parents thought her so much improved in health. I learned that the emulsion and oil had both agreed, and had been taken regularly since my last visit; she was rather tired of the oil, but not of the emulsion. She had gained much flesh and lost the haggard expression. Night-sweats had ceased, and the cough was so nearly well that she did not even require a lozenge. No expectoration; appetite fair. The dulness and bronchophony remained, but no moist sounds could be heard in either lung.

“This little patient improved so much under the continued use of the emulsion, that on Feb. 24th, 1866, she was able to undergo the operation of amputation of the leg above the knee, and she has since made an excellent recovery.”

DR. MOXON, of *Kirton Lindsey*, writes as follows of the good effects of the emulsion. "I have tried the pancreatic emulsion in the case of a young man affected with phthisis in quite an early stage. There is tubercle deposited in the apex of one lung. He had lost all appetite, complained of pain in the side, and tightness of the chest. He had only slight cough, great lassitude, and had lost weight considerably. He had been under treatment by Dr. — without any relief; tonics had not the slightest effect upon him. On seeing your report in *The Lancet*, I determined to try the 'emulsion,' and gave up all other treatment, except the occasional use of a stimulant liniment. He has taken four pounds of the emulsion. He had no difficulty in taking it; but, on the contrary, found it palatable. His appetite has improved, so that he takes food with a good relish. Has gained a little in weight. Does not feel any lassitude, except at times: has lost the sense of constriction in the chest, and is altogether much better. It is now six weeks since he has given it up. . . . I am very pleased with its effects. . . . I shall certainly use it again when I have a case which requires it."

DR. ROBT. GROWSE, of *Brentwood*, writes:—"I have employed the pancreatic emulsion simply for the purpose of increasing flesh. It is much more palatable than the cod-liver oil, is well borne by the stomach, and will, I think, materially aid me in the object I have in view."

DR. J. W. PHILLIPS, of *Cowbridge, Glamorganshire*, writes that he gave the emulsion to a "young lady, aged eighteen, in the third stage of phthisis. She had failed taking cod-liver oil for some time. After taking the emulsion she recovered considerably, was able to resume out-door exercise and cod-liver oil. She took in all three pounds."

*Extracts from "A Report of the Experience of Medical Men who have used Pancreatic Emulsion." Published by Churchill & Sons, 1867.*

DR. SMITH ROWE, *Margate*,

Found the digestion improved. A marked improvement in nutrition, with increase of weight. The effects of the emulsion were decided retardation of symptoms, and in four cases pro-

longing life to a very marked extent. Patients take the emulsion when they cannot take the cod-liver oil.

DR. G. B. CORNISH, *Taunton.*

In four cases the patients gained in weight and in the power of taking a larger quantity of food. There was also considerable improvement in the stage of tuberculisation, and in that of softening.

In all cases the patients can take emulsion when they cannot take cod-liver oil.

DR. CLIFFORD ALLBUT, M.A., M.B. CANTAB., *of Leeds.*

I have prescribed the pancreatic emulsion in at least one hundred cases. My weight tables show that the emulsion, like cod-liver oil, when it does good steadily, improves nutrition and weight.

I find, as a rule, scrofulous patients can take cod-liver oil, and that the so-called tubercular patients cannot take it. Even when these latter can take the oil, it does not benefit them generally speaking. These patients can, as a rule, take pancreatic emulsion. Indeed I have had no difficulty in persuading any patient to take it. My opinion is that pancreatic emulsion is of very great value in the true first stage of consumption, and that it is very valuable in the stage of tuberculisation, and less valuable in other stages.

P. E. MIALL, ESQ., M.R.C.S., *Bradford, Yorkshire.*

I have found emulsion has improved digestion, increased nutrition and weight. It can be taken when cod-liver oil cannot.

H. GIBBONS, ESQ., M.R.C.S., *Wolverhampton.*

Patients can take the emulsion much better than cod-liver oil, its effects were "very good" in the first three stages of consumption. I consider the Emulsion very far superior to cod-liver oil.

JOHN FOX, M.D., *Greenock.*

All the patients (about 24) stated that they were benefited by its use, and that it improved digestion.

J. SWIFT WALKER, M.D., *Hanley, Staffordshire.*

The emulsion (tried on thirty cases) increases appetite and promotes digestion, and increases nutrition and weight. Patients can take it when they cannot take cod-liver oil.

In the first and second stages of consumption the effect of emulsion is very good, much superior to cod-liver oil. In cases of old standing bronchitis, and also in debility after a severe attack, it is superior to any other remedy.

HENRY S. PURDON, M.D., *Belfast.*

The emulsion promotes digestion, and patients appear to grow in weight and flesh.

Patients can take emulsion when they cannot take cod-liver oil.

In one case a boy, aged 12, attacked by first stage of phthisis, the effects of the remedy were amazing; and at the present time no symptoms of consumption remain.

One case, a man, aged 40, stage of softening, derived much benefit from the emulsion, and has gained in strength and flesh. One case only a few months under treatment.

J. P. CASSELLS, M.D., *Glasgow.*

I have prescribed the emulsion in a large number of cases. It has improved the digestion and nutrition, and increased the weight of the patient.

I have found it equally beneficial in cases of wasting in poor children. And in one case of malignant disease of the pancreas—female, aged 45—where large masses of fatty-looking matter passed in the stools, and there was great wasting of the body, the patient improved much in general condition under the use of the emulsion, and the fatty matter ceased to pass in the stools in a rapid manner. Since my last report I have had a run of cases suitable for the use of the emulsion, and in which I have prescribed it very largely, with much benefit, so increasing the favourable opinion I have already expressed.

Patients can take the emulsion when they cannot take the cod oil.

A. MERCER ADAMS, M.D., *Boston, Lincolnshire.*

I found the emulsion most servicable, the patient could not

take oil—was in last stage of consumption. Rallied for a time by using it. Digestion improved and weight increased. I consider the emulsion a valuable addition to the nutritive agents required in the treatment of phthisis, and it is especially useful in cases where cod-liver oil cannot be taken.

G. T. W. MUGLISTON, ESQ., M.D., *Maryland Point, E.*

The emulsion assists digestion, improves nutrition, and in one case the patient gained three and a half pounds in six weeks. It improves the strength, and renders the expectoration more healthy and less copious.

The pancreatic emulsion seems to give general satisfaction and benefit, which is a great consideration, because there are many persons who cannot take cod-liver oil. I have recommended its use in three cases in second stage (softening).

1. Mrs. —, 35, had two children ill two years. After taking emulsion six weeks, gained  $3\frac{1}{2}$  lbs.; cough and other symptoms much improved.

2. Miss —, 28, ill one year and half has taken emulsion two months, with diminution of cough and expectoration.

3. Miss —, strumous abscesses, and softening of both lungs; loss of strength, appetite, and weight. Has taken emulsion eight weeks, with decided advantage over cod-liver oil. All symptoms better. Intends to continue emulsion.

4. Mrs. —, 27; five children; could not take cod-liver oil; it deranged digestion. Has taken emulsion one month, with great benefit; increase of weight and bulk. Cough much better, and feels stronger.

5. Mr. W. —, the most marked of all (stage of excavation). After a long course of emulsion, he now attends regularly to his duties as foreman in the fitting-shop of the Great Eastern Railway.

C. F. LEWIS, M.D. *Henfield, Sussex.*

The emulsion very much improves the appetite. I have no hesitation in saying, that in two cases in which I have given the emulsion it has quite exceeded my expectations. In one patient, when she commenced the emulsion, the left lung was in the stage of excavation, and the right in the stage of soften-

ing, which has been arrested, and the moist sounds in the left lung cleared away. I am now giving it in a third case.

C. PAGET BLAKE, M.D., M.R.C.P. LOND., *Torquay.*

The emulsion is an excellent adjunct to digestion. Decidedly beneficial in nutrition, and generally tends to increase weight. In many cases which quite revolted at the idea of oil, the emulsion was readily taken, especially when exhibited with equal parts of ginger wine and water.

I have found it highly beneficial in the first stage of consumption; of decided and permanent service in the second, and an immense help to other remedies for re-establishing the health.

I have found that a great many patients could not take the emulsion in milk; but I never knew any who could not take it in ginger wine and water. Probably this is owing to my patients at Torquay usually consuming so much milk and cream at other times; as I always order both in large quantities for consumption cases.

H. DOBELL, M.D., *London.*

I have prescribed it in about 2500 hospital cases, with results which, I think, may be fairly represented by those obtained in the 187 cases of which careful notes were taken, and which have been published in the *Lancet*.

It assists greatly in the digestion of fat and starch, and improves digestion generally. But it is necessary to use common sense in correcting any special derangements of digestion which may be present, by other remedies.

Maintains or increases weight according to the amount of weight previously lost, the power of taking food, and the quantity of emulsion administered.

In 187 published cases, emulsion agreed in 180; disagreed in seven. Cod-liver oil agreed in 75; disagreed in 98; was not tried in 14. In the 187 cases of which I have published results, no cod-liver oil was given during treatment with emulsion, so as not to confuse the effects of the two remedies. But in daily practice, I recommend both oil and emulsion to be taken, if the stomach will bear them. The proportion of cases in which emulsion agrees will not be as large as here

stated, unless care is taken to correct obvious defects in digestion by other remedies.

In the true first stage, my experience is derived principally from private practice, such cases not often appearing at hospitals.

Of the 2500 hospital cases who have taken the emulsion, many have been in an extremely advanced stage of disease; and in some of these the emulsion has appeared to prolong life in a remarkable manner, being retained on the stomach long after all other kinds of food had ceased to be tolerated.

Whereas oleinous fats, and especially cod-liver oil, are absorbed into the blood through the portal system, and serve an important purpose by rapidly presenting themselves for combustion and histogenesis, they do not and cannot take the place of solid fats—rich in margarin and stearin, fusible at higher temperatures than olein, and less easily oxidisable—which can only be absorbed by the lacteal system after pancreaticization. This accounts for the remarkable stability of the improvement which accompanies and follows the administration of pancreatic emulsion, after cod-liver oil has been given without success, or with very evanescent success.

TREVOR NORRIS, JUN., M.D., *Carlisle*.

I believe emulsion improves digestion.

The most notable feature I have observed in the exhibition of the emulsion, is relief from the craving and sinking so often found in phthisical patients.

JULIUS ALTHAUS, M.D., *London*.

Digestion and nutrition were much improved.

When physician to the Royal Infirmary, I prescribed it in about twenty cases of tubercular phthisis, where cod-liver oil did not agree.

I have prescribed emulsion in a number of cases of nervous disorders, especially hysteria associated with anæmia, and paralytic affections connected with mal-nutrition. In all of these cases emulsion was well borne, and appeared to be of considerable benefit in improving assimilation and general condition of the patient.

G. LINDSAY BONNAR, M.D., *Cupar.*

Patient was very fond of it at first, and it evidently was nutritious ; but as it was a case of advanced phthisis, the waste was not nearly compensated for by the administration of nutriment.

In this case recourse was had to the emulsion, owing to the inability of the patient to retain oil on the stomach, even in minute doses.

It is highly nutritious and agreeable, as well as an easily-digested article of food. Very valuable as a substitute for cod-liver oil.

It is calculated to be beneficial in all cases where the tone and vigour of the system require repair.

T. CLIFFORD ALBUT, M.A., M.D. CANTAB., *Leeds.*

Effects on nutrition and weight good.

Mrs. J. H., *æt.* 32, phthisis essentialis (non-scrofulous).

Cod-liver oil tried in all ways for five months, but could not be continued ; caused nausea, and it did no good.

Pancreatic emulsion could be taken regularly and digested.

In this case there was loss of flesh two years. Night sweats, debility, and dyspepsia, eighteen months. Cough, one year. Hæmoptysis frequent ; first attack eight months ago.

This case came under my care in November, 1865. Pancreatic emulsion begun February, 1866—October, 1866. Has steadily improved, and has gained 18 lbs. in weight. No night sweats. Appetite described as excellent. Slight cough. No spitting. Emulsion regularly taken and digested.

May, 1867.—Aspect healthy. No cough. Weight steady. To omit emulsion.

P.S.—This I send as a good example of what I mean by the class of cases which do benefit on pancreatic emulsion, and not on cod-liver oil.

I have one or two families in my eye, of gentry living near here, for whom and for whose children I have prescribed pancreatic emulsion with great success. I have one under my care now. Last year I ordered for a delicate-looking, thin-

skinned boy, with lustrous eyes, long eyelashes, fine wrists and ankles, silky hair, tendency to flush towards evening and perspire at night, uncertain appetite, unequal physical energy, etc., the pancreatic emulsion. He strengthened wonderfully under it, and now remains better, or indeed well. But if he leaves the pancreatic emulsion off, he tends to fall back. To his younger brother I am now called, who is such another boy, and with same symptoms. He is put on pancreatic emulsion, and is doing the remedy the same credit. In many such cases I have found it valuable, and for such cases it seems to me to surpass any other, and especially for them.

R. GUTTERIDGE, ESQ., M.D., *Leicester.*

The patient rapidly gained both flesh and strength.

C. GLENN BOTT, M.D., *Sheffield.*

In the cases (about nine) in which I have tried the emulsion, the result would be to encourage my continuance to use it.

H. S. LEVERTON, ESQ., M.R.C.S., *Truro.*

The emulsion decidedly assists digestion and nourishes the body. In two or three well-marked cases I have found that patients can take the emulsion when they cannot take cod-liver oil.

I intend to try it thoroughly in cases of phthisis. In cases of debility, wasting, etc., from any cause, this is most valuable.

JOHN SKAIFE, ESQ., M.R.C.S., *London.*

Digestion and nutrition are improved. Weight is increased. The general plight of the body is improved in every stage. Patients can take emulsion when they cannot take cod-liver oil. The emulsion invariably agrees, unless there is some special stomach derangement.

C. B. GARRETT, M.D., *Hastings.*

The emulsion agrees well, and adds to weight and strength. In the second and third stages the effect was good. I think

it a splendid invention. In every case patients can take the emulsion when they cannot take cod-liver oil.

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*Extract from a Letter published in the REPORT OF MEDICAL MEN, etc.*

“ *May 27th, 1867.*

“ I commenced taking the ‘ pancreatic ’ early in September, while staying at Maidstone. I took two teaspoonfuls twice a day in milk, flavoured with a teaspoonful of rum, and continued this for three weeks, also adding very considerably to my usual amount of farinaceous food. I found that I steadily lost weight at the rate of 1lb. per week, although I was not losing before I began the treatment. Although much discouraged at this result, I felt convinced that it did not arise from the use of the fat, but from taking the additional food, milk, and stimulants ; also from the depressing climate at Maidstone. I therefore removed to Tunbridge Wells, and left off the extra diet, giving up stimulants entirely, but keeping to the pancreatic emulsion ; the consequence was, I gained weight at the same rate as I before lost it, but could not get an ounce above the 9st. 4lb., which was my weight before I began to lose at Maidstone. I now took the fat, mixed with white of egg, instead of milk. My digestion wonderfully improved, and I suppose, as a consequence, my breathing also got much better. The sense of exhaustion in the early part of the day nearly disappeared, as did also the pain between the shoulders, now quite gone. I also slept better.

“ I got to Cambo in January. It is a small watering place, about twelve miles south of Bayonne, in the Basses Pyrenees, and at an elevation of about 1500 feet above the sea, from which it is distant, in a straight line, about ten miles.

“ In February, a family bereavement caused me to return home, and the severity of a night and day journey to England, rather tried me. I almost lost my voice for several days, and did not quite get over it until the end of the month, when we had a week or two of very dry, bracing weather in the Isle of Man, during which my general health improved very much, and continued to do so even through the severe weather in March. From the beginning of February, I left off taking the

pancreatic emulsion for six weeks, so that the improvement was solely owing to the effects of climate; but I found that, in spite of being better in every other respect, the expectoration and difficulty of breathing began to increase; and I have now returned to two large teaspoonfuls of the fat per day; and I already perceive an improvement, both in breathing and expectoration. I think I have taken about twelve pounds of the pancreatic emulsion during the last nine months, and I take the final results to be as follows:—digestion improved; breathing very much improved; strength improved; sleep perfectly restored; pain between the shoulders gone entirely; weight stationary; expectoration stationary.

“I am in very much better spirits than I was this time last year; and I trust, by a judicious selection of climate, and the aid of the valuable remedy, pancreatic emulsion, I shall be able to ward off for a long period the serious increase of the symptoms with which I have been so long threatened.”

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*From DR. DOBELL'S work on "The True First Stage of Consumption."*

“My experience of the action of pancreatic emulsion is now so large, and my observations have been so cautiously and doubtfully made, that I dare to speak with a confidence which I trust may be distinguished from dogmatism. Pancreatic emulsion of solid fat is a natural substitute for the inactive or perverted pancreatic function. It supplies the lacteal system with solid fat in a condition fit for absorption, fit for transmission through the lymphatic glands, fit for combustion in the pulmonary blood, for the protection of tissues, for histogenesis, and for general utilisation throughout the organism. By an artificial expedient we supply the missing elements of normal nutrition in a natural form. Thus time is gained, the imminence of tuberculisation is removed, and the means for the restoration of the normal function of the pancreas, by which alone a true cure is to be effected, can be adopted at leisure and in safety, under conditions favourable to success.

“Cod-liver oil, even when it agrees and passes into the blood, does not completely represent the solid fats of the natural food, and therefore cannot permanently take their

place. As a temporary substitute for natural fats introduced by the natural route, it answers admirably; but, sooner or later, in some cases very soon indeed, the portal system becomes choked, and refuses to absorb more oil; the oil disagrees with the stomach, it rises, it spoils the appetite, and thus not only ceases to do good, but does positive harm by preventing the patient from taking as much food as the stomach might otherwise call for and digest. None of these disadvantages occur with well-made pancreatic emulsion of solid fat.\* The consequence is, that an artificial supply of natural fat by the natural route can be kept up for an indefinite time, if required, while the appetite is usually improved and the digestion also; and, at the same time, a very large quantity of amylaceous food is rapidly converted into dextrine and sugar by the pancreatic action of the emulsion, and thus a most important assistance in the economy of fat is given by the increased supply of carbon from the carbo-hydrates, at the same time that fat is being thrown into the blood by the emulsion."

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*From a "Paper on Phthisis Pulmonalis and its treatment by Pancreatic Emulsion of Fat."*

By R. J. KINKEAD, A.B., L.M., T.C.D., L.R.C.S.I., &c.

*Medical Press and Circular, Feb. 26, 1868.*

"THE chief obstacles to the administration of cod-liver oil are the disagreeable taste and its occasioning sickness. In such cases, and where the repugnance to the taste cannot be overcome, I have found pancreatic emulsion of fat a most valuable agent. The office of the pancreatic juice in the body (it has alkaline properties) is to emulsify the fats, and render them fit for assimilation by the lacteals. The acid state of the gastro-intestinal tract in phthisical patients neutralises the action of the pancreatic secretion, and in some cases causes an excess of acidity. Now, pancreatic emulsion offers to the stomach the most easily digested fat prepared for absorption by the very juice which disease has neutralised. So

\* Up to the present time I have not seen any pancreatic preparations that can be relied upon, except those prepared by Mr. Schweitzer for Messrs. Savory & Moore.

that, in one case, we have pancreatic juice neutralised by acid, and pancreatic juice and fat free to act, and therefore the fat freely absorbed; and where the acid is in excess by the addition of an alkali, we have pancreatic juice and alkali neutralising acid, and pancreatic juice and fat free to act. But what is, perhaps, its most important action, is the educating the stomach to receive and digest oils; for, after the emulsion has been administered for some time, it will be found that cod-liver oil will agree in those cases in which before it did not.

“The following case is not to be considered as a complete observation, owing to my unavoidable absence from home during a portion of the patient's illness; nor do I think I am entitled to state that her recovery was entirely owing to the use of pancreatic emulsion; neither do I say that her recovery will be permanent. But I do say that, from the circumstances of the case, I am entitled to argue that the emulsion aided, in a great measure, her restoration to health; and that, although the disease may recur, yet a rescue from immediate death and alleviation of suffering, if occasioned by a remedy, are sufficient, even if its powers are limited to few cases, to place that remedy high in the list of our most valued ones. But I believe that more extensive experience will prove what theory and the little experience we now have indicate,—that pancreatic emulsion, supplying to the system as it does (what it most wants in scrofulous cachexia) a large amount of nutriment with the least amount of digestive labour, and in a form most easily assimilated, will, when combined with proper treatment, and judiciously followed up by dietetic and hygienic rules, enable us to assist nature to cure a much larger proportion of phthisical cases.

“Towards the end of August, 1867, I was ‘called in’ to attend C. G., æt. 19, unmarried, by occupation a laundress, suffering from a severe cough of about three weeks' duration.

“She had, for a girl of her rank of life, a peculiarly fair, delicate complexion. The veins could be clearly seen ramifying under the skin; upper lip slightly strumous; eyelashes very long; and hair of a reddish brown colour.

“Her father and three brothers had died of acute phthisis.

“Up to the period of her present illness her health had been good. At the time I first saw her, she presented most pro-

minently the symptoms of inflammation of the lungs, but the breathing was more hurried and difficult than the amount and violence of the inflammation (confined to a portion of base of left lung) would account for. On a more extensive examination, I found the right side perfectly healthy, but there was slight dullness under left clavicle, and in the supra-scapular region.

“ Expiration and inspiration were equal, the latter, too, was interrupted.

“ The pulse was rapid and weak.

“ Blisters, small doses of tartar emetic, and the free administration of wine and nourishment, reduced the inflammation; the respiratory murmur returned (save in the sub-clavicular and supra-spinous regions), and she was enabled to return to her usual occupations. From this time (Sept. 5), till sent for on Sept. 29, I did not see her.

“ I found her complaining of pain in left side (pleuritic stitches); short hacking cough; night perspiration; respiration rapid; pulse 90, weak; expectoration glairy and frothy, and containing bodies like grains of rice; dulness increased in extent, reaching from left clavicle to upper margin of fifth rib; bruit in left subclavian; face pale; complains of weakness. Ordered potass iodidi, gr. xxxii.; liq. ferri iodidi, ℥iii.; ol. morrhue, ℥viiss.; a dessert-spoonful three times a day; wine, jellies, and nourishment were freely administered.

“ On the 5th of October she got an acid and iron mixture, which restrained for a short period the perspiration, but she rapidly got worse; great wasting set in; lips became exsanguin; dullness increased; expectoration became nummular and purulent; respiration difficult, and I detected pectoriloquy, and one day metallic tinkling. The stomach became so irritable that it was with difficulty that it could be made to retain even a small portion of milk. The perspiration now became excessive; the pain in the side was constant and agonising, and she sank so low that I expected her death daily. She complained so of want of rest from the pain and cough, that I gave her, as she presented no symptoms of deficient aeration of her blood, ℞ liq. morphie hcl., ℥30, acid hydrocyan. dil. gtt. i., liq. bismuthi (Schacht) f. ℥i., emuls. amygd., f. ℥i., omni nocte, s.; this gave some relief.

“ On the 14th October I commenced the pancreatic emulsion, in two teaspoonful doses, two hours after dinner and supper,

but on the second day I had to diminish the dose to one and a-half spoonful, owing to its occasioning sickness. After this, I can only describe its effects by saying that it seemed 'to work like a charm.' The cough grew less, the drenching night perspiration diminished; the respiration grew so much easier that the patient was able to lie down at night, which for some time previous had been impossible, owing to the difficulty of breathing it occasioned; the pains grew so much easier that she was able to dispense with the anodyne draught at night; the pulse sank gradually from 130 to 70, and, at the same time, grew full and strong. She increased in weight and grew stout, and her strength returned by degrees.

"Now, the mere fact that after taking the emulsion she so rapidly recovered, would, by itself, be very insufficient evidence as to the efficacy of that remedy; it would be merely a '*post hoc ergo propter hoc*' assertion, and, consequently, of very little weight. But this fact, purposely omitted from the report of the case, changes the nature of the assertion, and proves that the emulsion was, at least, the most important agent in effecting her recovery. Two bottles of the emulsion were first sent down from Dublin. Whilst taking these, the improvement in the patient's health was most marked; before the second bottle was finished a fresh supply was written for, but owing to some unaccountable delay it did not arrive till nine or ten days after the first supply was exhausted. During this interval, although the other treatment was continued, she sensibly fell back. The cough, pain in sides, and perspiration became worse, and she felt weak and desponding. On recommencing the emulsion, she began again to amend, and continued steadily to recover.

"In a chronic case, the cough and breathing grew easier, and the perspiration ceased during the use of the *emulsion*. In both these cases, cod-liver oil, which had hitherto been persistently rejected, was retained by the stomach after the emulsion had been administered for some time.\*"

*From the CHEMICAL NEWS, March 30, 1866.*

"PANCREATIC emulsion is now an article of large consumption,

\* "MR. KINKEAD, ON PHTHISIS AND ITS TREATMENT.—In answer to several correspondents, we have ascertained that the pancreatic emulsion of fat, prescribed and mentioned by that gentleman in his paper of February 26th, was obtained of Messrs. Savory & Moore."—*Medical Press and Circular*, March 13, 1868.

and its preparation by Mr. Schweitzer, at Messrs. Savory & Moore's, has led that gentleman to the discovery of a new and interesting fact. Lard, treated with fresh and acid pancreatic secretion, is readily miscible with water, so forming an agreeable emulsion. When this emulsion is treated with ether, the fat is completely separated to all appearance unchanged. But this separated fat retains its power of emulsifying on the gradual addition of water, not with great effort and the aid of a pestle and mortar, but by simply stirring the two together with a glass rod. This is a most curious fact, which well deserves the attention of the chemist and the physiologist. It lends a strong support to the opinion of Dr. Dobell, that the pancreatic juice is a most important agent in the digestion of fat, an opinion contrary to that expressed by some physiologists. . . . It proves on the contrary that the constitution of the fat undergoes an essential change by contact with the pancreatic secretion, the exact nature of which, however, we have yet to learn. It is not saponification, for the fat globules in the emulsion, though very minute, are clearly distinguishable and uniform in size. *We mention this fact as the distinguishing character of a true pancreatic emulsion, which has, moreover, a marked acid reaction that serves to distinguish it from an emulsion made with the assistance of an alkali.*"

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*From a letter by DR. DOBELL in "The British Medical Journal,"  
February 8, 1868, on Pancreatine.*

"So little is at present known of the medicinal effects of pancreatine, that I think the following note may be of interest to medical men.

"In July, 1866, I was consulted by a solicitor from Cornwall, aged twenty-one, whose rapid decline in health was causing the greatest concern among his friends. He had the general symptoms of advancing tuberculosis, softening of the upper part of the left lung, partial consolidation of the right; weight 119 pounds. With the assistance of cod-liver oil, pancreatic emulsion, good diet, and a winter at Bournemouth, where I placed him under the care of Mr. Allis Smith, he got on very well, and returned to Cornwall in March, 1867. September, 1867, he wrote me: "Cough and expectoration increase. I feel

weak in body, occasionally having heavy perspirations ; unable to get pancreatic emulsion for some time, but expect some to-day." November 19, 1867.—He had considerably improved since his note in September, and I again sent him to Bournemouth, under Mr. Allis Smith's care. Weight 121 pounds four ounces. January 3, 1868.—He wrote as follows : ' For the past six weeks I have been regularly trying pancreatine (Savory & Moore's). The effect it has had on my digestion is most extraordinary ; and during that time I have taken about two table-spoonfuls per day of cod-liver oil (following them immediately with ten grains of pancreatine) without the smallest feeling of indigestion ; this I could never do before. I have, in the same time, gained ten pounds in weight. My friend Dr. Coates has, in the last month, given it to two patients (the second one only lately) ; the first, who is suffering from tubercular disease of the lungs, and was unable to take cod-liver oil, and was a martyr to indigestion, says that since she has taken the pancreatine she has been able (like myself) to take the oil and still not feel indigestion. Dr. Coates desires me to tell you that when he has more data he will write you fully.'

" Writing again, January 12, he says : ' My bodily health seems better in every way ; I have no indigestion whatever since I began the present treatment ; weight to-day 134 pounds, making a total increase of 12 pounds 12 ounces since November 19.' It will be observed that, although in July, 1866, he was in the softening stage of tuberculosis, he weighs at the present time 15 pounds more than he did then. But the particular interest of the case lies in the circumstance that after having been kept up in weight by good diet, cod-liver oil, and pancreatic emulsion, he made a leap of 12 pounds 12 ounces when pancreatine was added to his treatment, and that the difficulty which he had always felt in digesting cod-liver oil disappeared. I have seen similar effects in other cases, though not quite so sudden."

DR. CLAY, *Launceston*.

" DR. CLAY will thank Messrs. Savory & Moore to send him a bottle of pancreatine about three times as large as last received. The short experience Dr. C. has had of Pancreatine is very favourable, it allows cod-liver oil to be taken with impunity by patients who are quite unable to do so without the drug."

work in body, occasionally having very painful attacks; unable to get pancreatic emulsion for some time, but expect some to-day." November 19, 1887.—He had considerably improved since his visit in September, and I again sent him 10 ounces month under Mr. Allen Smith's care. Weight 121 pounds four ounces. January 2, 1888.—His weight is as follows: For the past six weeks I have been regularly taking pancreatic (Barry & Allen's). The effect it has had on his digestion is most extraordinary; and during that time I have taken about two table-spoonfuls per day of cod-liver oil (following them immediately with ten grains of pancreatin) without the smallest feeling of indigestion; this I could never do before. I have, in the same time, gained ten pounds in weight. My friend Dr. Coates has, in the last month, given it to two patients (the second one only lately); the first, who is suffering from tubercular disease of the lungs, and was unable to take cod-liver oil, and was unable to indigestion, says that since she has taken the pancreatic she has been able (like myself) to take the oil and still not feel indigestion.

*Butler & Tanner,  
The Selwood Printing Works,  
Frome and London.*

"Writing again, I have to say that my bodily health seems better in every way; I have no indigestion whatever since I began the present treatment; weight to-day 124 pounds, making a total increase of 13 pounds 12 ounces since November 19. It will be observed that, although in July, 1886, he was in the roiling stage of tubercular disease, he weighs at the present time 15 pounds more than he did then. But the particular interest of the case lies in the circumstances that after having been kept up in weight by good diet, cod-liver oil, and pancreatic emulsion, he made a leap of 12 pounds 12 ounces when pancreatic was added to his treatment, and that the difficulty which he had always felt in digesting cod-liver oil disappeared. I have seen similar effects in other cases, though not quite so sudden."

*DR. CLAY, ANGLICAN.*

"Dr. Clay will thank Messrs. Barry & Allen to send him a bottle of pancreatic about three times a day as last received. The short experience Dr. C. has had of pancreatic is very favourable; it allows cod-liver oil to be taken with impunity by patients who are quite unable to do so without the drug."