

THE ANALYST.

BRANDY.

By OTTO HEHNER.

(Read at the Meeting, January 11, 1905.)

ON November 29, 1902, there appeared, as a supplement to the *Lancet*, a report of a Special Analytical Commission on "Brandy: its Production as Cognac, the Present Position of the Industry in the Charentes, and the Supply of Genuine Brandy to this Country." This report appears to have been the stimulus which caused certain Public Analysts to take up the examination of commercial brandies under the Sale of Food Acts. Although the report of the *Lancet* Commission contained not only nothing that should have been novel to any well-read Public Analyst, but gave much less information than had been obtainable for at least ten years previously, it seems to have directed attention to what is undoubtedly a most important question. It is our business as Public Analysts to carry out the provisions of the Sale of Food and Drugs Acts, and to see that when the public demands any article of food or drink, an article of the "nature, substance, and quality demanded" is supplied. It is equally our business as scientific men to act up to the scientific knowledge available, but not to go one step beyond, and pretend to do that which is in our present state of knowledge impossible.

It will be seen that the *Lancet* report, although dealing with brandy, concerned itself solely with its production at Cognac and with the position of the brandy industry in the Charentes, the home of the Cognac industry. That is to say, it dealt with that variety of brandy which is known as "cognac." If all brandy were cognac, if only that which is produced in the Cognac district and by the Cognac methods had the right to be called "brandy," the matter would be a comparatively simple one. We are all agreed that the term "cognac" applies only to a distillate obtained from wine, and from nothing else, containing the full flavour peculiar to cognac—a flavour only obtainable in a product resulting in a more or less primitive manner by pot-still distillation, without much fractionation or purification. Opinions are, and may be legitimately, divided on the question whether "cognac" nowadays belongs only to the product obtained, as described, in the Cognac district itself, or whether the term has lost its geographical significance, as "Munich beer," "Yorkshire pudding," or "Bath bun" have.

The term "brandy" is obviously not synonymous with "cognac," for in the immense wine industry—one of the greatest agricultural industries of the world—wine distillates are obtained which could not possibly be classed or sold as "cognacs," and yet possess wine flavour or bouquet. Such distillates are known in this country as "brandy." I take this term to be a corruption of the German word "Branntwein," literally "burnt wine"—a wine distillate. Many generations ago, before Continental nations had learned to prepare distilled alcoholic beverages from grain or other starchy material, all "Branntwein" was a wine distillate, whilst now it only means a distilled alcoholic beverage mostly made from grain, but not necessarily from that only. It corresponds to "eau de vie" of the French, or the "fire-water" of the Red Indian. But while both the French and Germans were satisfied with the gradual

drifting of the respective terms "eau de vie" and "Branntwein" to beverages not necessarily made from wine—just as we apply the word "vinegar" no longer to acidified wine, but to acid liquors of other derivation—the English purchaser, as of old, attached the term "brandy" to the wine distillate only. Brandy not being an English production, it is perhaps natural that he should remain behind in the knowledge that the industry was changing.

I will not for the moment stop to consider whether the English purchaser is reasonable in attaching a meaning to a term which it no longer possesses in other countries, but will for the present put myself upon the standpoint of the purchaser, only expressing my opinion that his view is old-fashioned, narrow-minded, and unreasonable. In the case of the national distilled alcoholic beverage "whisky"—which once upon a time was the liquor obtained from fermented malt-wort only, distilled from pot-stills—the nation has not objected to the widening of the term, substances other than malt being used, and scientific rectification stills having largely taken the place of the old pot-stills. Differences in flavour and in composition have, of course, followed the alteration in manufacture. In the case of beer the changes are wider still; there is not, in fact, a manufactured article of food or drink where changes in preparation and in composition are not continually being made. Brandy, for the purposes of my argument, shall form an exception, for the purchaser, however ignorant and prejudiced, is entitled to his prejudice, and the vendor must supply him with "the article demanded."

We analysts have no other means than chemical, or physico-chemical, of ascertaining whether an article is "genuine" or not, and for us the whole question is an analytical one. We obviously cannot distinguish pure alcohol derived from wine from that derived from the potato, any more than we can differentiate between sugar made from the cane and that made from beet. We have nothing to go by but the concomitants of the alcohol, the "impurities" which give to the alcohol its aroma, flavour, and character. Apart from solid substances that have been taken up from the wood of the casks, or that have been intentionally added for colouring or sweetening, the "impurities" of spirits belong to five or six *classes* of bodies—alcohols other than ethylic; acids, mainly acetic; aldehydes, chiefly ethylic; ethers; basic substances; and furfural. Every one of these classes contributes its quota towards the character of the beverage, probably also towards its physiological properties.

Since 1883, when Nessler and Barth correctly stated (*Zeitsch. Anal. Chem.*, vol. xxi., p. 33) that hardly any chemical data existed for the examination of distilled beverages, fair progress has been made in the working out of methods for detecting and determining the amounts of the various *classes* of substances above enumerated, although, as we all know, much remains to be done. But no advance worth recording has been made—nay, barely has the attempt been made—to differentiate between the individual members which make up each class of these "impurities." Nor is there much hope that such differentiation of closely-allied substances, the sum total of which amounts to almost intangible traces, will be practicable for the purposes of the Public Analyst. Let us take only the "higher alcohols," or "fusel oils," which generally form the larger proportion of the "impurities." It is known that the higher the molecular weight of an alcohol, the greater its toxicity. It is also known

that secondary alcohols are more noxious than primary and unsaturated more than saturated; yet the analyst must content himself with determining, as best he may, the sum total of the higher alcohols, leaving altogether aside the question whether these consist of harmless or noxious members of the group. Again, the analyst can, with satisfactory accuracy, determine the amount of alkali required to hydrolyse those constituents which are called "esters," and to calculate the alkali consumed into any imaginary member of the "ester" group; but whether the constituents thus measured consist of valueless ethyl acetate or of complex and valuable members is beyond his ken; and so on with each one of the groups.

Analytically, therefore, the fringe only of the subject has been touched. A vast mass of analytical data, valuable as far as they go, has, however, gradually accumulated. Hundreds of analyses of brandy, and of other similar beverages, have been published during the last ten or more years, mainly by Girard and Cuniasse, Rocques, Sell, Mastbaum, Allen, Schidrowitz, and many others; and pages of figures containing analyses as full as practicable—quite as full as the few of the *Lancet* Commissioner (some of which are quoted from French sources)—are contained in Koenig's magnificent collection ("Chemie der Menschlichen Nahrungs und Genussmittel," fourth edition). New series of analyses are continually being published, the latest being an admirable contribution by Karl Windisch (*Zeitsch. Unters. Nahrungs und Genussmittel*, vol. viii., October, 1904, pp. 465-505). This closely-reasoned paper is worthy of very attentive study. Among other things, Windisch disposes once more of the suggestion which has been made by Looock (*Zeitsch. öffentl. Chem.*, 1900, vol. vi., p. 397) that all genuine wine distillates contain furfural, whilst silent spirits were said to be free from it. Furfural is shown to be an accidental product of the decomposition of the pentoses; it is often—but by no means always—present in brandies. As a measure of genuineness it is useless. Windisch further discusses the much-debated claims made by Girard and Cuniasse, Rocques, and other French chemists, for the "coefficient of impurities," the sum total of volatile acids, esters, aldehydes, higher alcohols, and furfural, expressed in parts per 100,000 of the water-free sample. The coefficient of impurity for real cognac is alleged to be never less than 300, according to Girard and Cuniasse, and to Lusson not less than 340, while Rocques further claims that pure wine distillate contains approximately equal quantities of higher alcohols and of esters. As regards the latter relation, I may at once point out that in Rocques, "Analyse des Alcools et des Eaux de Vie," analyses of real cognacs are given showing this proportion to vary from 0.9 to 2.5 (higher alcohols divided by esters), while in other real brandies—not cognacs—the proportion varies from 0.43 to 2.92. As regards the "co-efficient of impurities," it may be worth while to quote the averages of all analyses of Girard and Cuniasse, as given by Koenig (*loc. cit.*), p. 1511, etc.:

Industrial alcohols ...	...	...	...	17.6
Real cognacs ...	...	...	...	486.3
Normal cognacs ...	...	...	...	473.3
Commercial cognacs (known brands) ...	...	...	...	257.3
Artificial cognacs ...	...	...	...	57.8
Marc brandies	852.1
" " (fair quality)	238.5
Kirsch brandies	401.5
" "	448.6
„ (imitation)	64.6

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Rum	690.5
"	593.9
Mixtures	299.4
" (artificial)	104.6
Cider brandy	710.2
Whisky	409.4

The figures for "real cognacs" vary from 259.6 (a sample marked "Aunis, good, but not warranted") to 1174.3 (a very old cognac), while the "commercial cognacs" show variations from 74.6 to 703.2. It may be that the "commercial cognacs" include admixtures; but there is no evidence to that effect. A sample, twenty years in bottle, and therefore presumably genuine, showed a coefficient of "impurity" of 131.7. The limit of 300 cannot, therefore, be maintained, even for the cognacs analysed by MM. Girard and Cuniasse. In an article like brandy it is practically impossible to furnish unexceptionable evidence of its purity. No single person would ever be in a position to follow its production from the vineyard to the bottle. Therefore proof of genuineness cannot easily be obtained. On the other hand, the classification into "real cognacs," "normal cognacs," "commercial cognacs," and "artificial cognacs," adopted by Girard and Cuniasse, is altogether arbitrary, and as a rule based upon nothing better than the figures obtained by analysis, and as the fixation of a limit of "impurities" is an arbitrary process, this procedure begs the whole question. Similarly, referring to Mr. Vasey's book on "Analysis of Potable Spirits," the classification into types of brandies (which ought really to be types of cognacs) and types of blended spirits rests upon insufficient evidence.

For brandies of sources other than those of the cognac district, it has been conclusively proved upon evidence which is exceedingly strong that the coefficient of "impurity" is quite inapplicable. Thus Mastbaum (*Zeitsch. Unters. Nahrungs und Genussmittel*, 1903, pp. 56, 57), analysing and recording the results of twenty Portuguese brandies of authenticated origin, and following Girard's methods of examination, finds the "coefficient of impurity" to vary from 107.5 to 977. In nine samples out of twenty it was less than 300, while the relation of esters to higher alcohols, instead of being unity or thereabouts, varied from nine to one. Mastbaum also finds furfural absent in some of these samples, among these the very finest.

The "coefficient of impurity" has now, however, officially received its quietus, a report by a committee appointed by the French Minister of Commerce by a decree of March 22, 1904 (which report was published in the *Moniteur Officiel de Commerce* of June 30, 1904, and is commented upon in *Nature* of November 3, 1904) showing that while ordinarily the coefficient in cognacs and *fine champagne* ranges between 275 and 450, it is less in Armagnac brandies, while in those from the Midi and Algeria it varies from 25 to 500.

What possible value can attach to an analytical factor which varies from 25 to nearly 1,200?

The French Committee, therefore, "are unable to recommend that any limit should be fixed," and they, as other observers before them, reported that "expert tasting (*dégustation*) must be considered as an indispensable complement of chemical analysis."

The slightest consideration shows that immense variations in the "coefficient of impurities" are bound to occur. By keeping, large proportions of aldehydes are formed; when the brandy is made, as it often is, from wine that is more or less "off," variable amounts of acetic acid pass into the distillate, and the acidity, again, controls the amount of esterification. As regards the higher alcohols, which mostly form a very large proportion of the total "impurities," these are for the most part not products of the alcoholic fermentation by yeasts at all, but are formed after the chief fermentation is over by bacterial action upon carbohydrates (Emmerling, *Berichte*, 1904, p. 3535), under anaerobic conditions, and their production is not under practical control of the vintner. But the manner of distillation more than anything else controls, and is bound to control, the composition of the distillate. If from a badly-fermented wine the spirit be distilled off by crude means, large quantities of fusel oil and other products pass over—little from sound wines distilled, as they sometimes are in distilleries, from the water or the brine bath. The first fractions of the distillate are naturally comparatively rich in "impurities." Experiments made by the Swiss Government show that when wine is distilled the fusel oil coefficient varies from 660 to 170 in successive fractions. The *Lancet* commission's table on p. 1511 exhibits variations from 334 to 37. Taking all circumstances into consideration, it follows that the "coefficient of impurities" is largely an accidental quantity, applicable, under proper restrictions, to products made in the same way from approximately uniform crude products, but not applicable to all brandies alike, nor useful for the purpose of fixing a standard under the Sale of Food and Drugs Act.

The French originators of the coefficient knew this full well, for, with all their advanced knowledge of the present time, they are in the same position as were Nessler and Barth in 1883, when they said (*loc. cit.*): "Without doubt the sense of taste and smell of the connoisseur are better reagents for quality and purity of brandy than are chemical means," a position confirmed by W. Fresenius, 1890 (*Zeitsch. anal. Chem.*, p. 283); again by Sell in 1892 (*Arbeiten a.d. Kaiserl. Gesundheitsamte*, vol. vi., p. 335), who warns the analyst that he cannot analytically prove with certainty the purity or impurity of any sample, but that he has also to consult his senses; by Bersch (*Nahrungs. Genussmittel*, vol. ix., 1895, p. 116), who insists upon the same thing, and suggests that in every case involving a prosecution the judgment of the chemist must be confirmed by that of one or more tasting experts. In 1895 Rocques (*Moniteur Scientif.*, April) strongly recommends to combine chemical analysis with *dégustation*—that is, tasting and smelling the brandy in its concentrated form, as well as diluted with warm water. Girard and Cuniasse recommend the same course, and Koenig, summing up in 1904, with the knowledge of all the analytical work published up to that time, warns the chemist that "taste and smell by experts afford a safer foundation for an opinion than does chemical analysis."

We judge nearly all our food-stuffs, certainly all our "Genussmittel," as distinguished from "Nahrungsmittel," by our senses of taste and smell, and not by analysis. We cannot distinguish the cheapest from the most expensive wine by analysis; I know of no analytical difference between a halfpenny and a one-shilling cigar, nor between the cheapest tea and the finest. Flavours have been and are still, in most cases, beyond our analytical grasp.

Having quoted the opinion of the above chemists who have specially concerned themselves with the analysis of brandy and other alcoholic distilled liquors, I would contrast with it, without further comment, the position taken up by some Public Analysts in this country, namely, that the determination of the amount of ethers is sufficient to form a judgment upon which a vendor may be criminally prosecuted—nay, further, that this single determination justifies them in giving a definite certificate to the effect that a sample, because deficient in ethers—judged by an imaginary limit—contains a definitely-stated percentage of spirit *not derived from the grape*.

It would be easy to quote from the hundreds of published brandy analyses numbers referring to ethers only, and which show that these fluctuate as widely almost as the “coefficient of impurities.” In undoubtedly genuine brandies ether coefficients have been found as low as 18 and as high as 450. I myself have had in hand quite a number of brandies which I have received from responsible persons, and with every assurance that they consisted of nothing but good commercial wine distillates, and which yet contained far less than the limit of 80, which is associated with certain recent legal proceedings. Almost in every instance when a brandy not produced in France is examined the ether number is low, and to say that a producer of a wine distillate in Algeria, Spain, Portugal, California, or Australia, has no right to call his distillate a “brandy” would be as unreasonable as to suggest that the Russian peasant has no right to call the fat which he churns from his milk a butter, simply because it sometimes differs in composition from that of the Australian or English producer.

This position is emphasized by the necessity under which some analysts have lately found themselves of adopting as a definition of brandy “an alcoholic liquid obtained from wine by distillation in *pot-stills*.” It may well be that a wine distillate from “pot-stills” has a stronger and perhaps more valuable flavour than a product made from some other kind of still; but this, I maintain, is a question for the fancy of the consumer.

It is interesting to inquire what is the probable reason for the selection of the “ethers” out of the whole list of concomitants which chemists have found necessary to determine for forming the best possible judgment on a “spirit.”

I am firmly convinced that this selection is due mainly to prejudice. The chemist associates the term “ethers” with pleasant-smelling, aromatic substances. That the “ethers” contribute their quota towards the flavour of a brandy must be obvious; but that they are far removed from being the sole, or even the main, factors is apparent from the fact that when an alkaline hydroxide is allowed to act in the cold upon a brandy the aroma undergoes comparatively little change. For all other constituents which the analyst can determine, no good case in favour of brandy can possibly be made out. In the eyes of the public, the Bench, and especially in those of the Medical Profession, it would not be considered a recommendation if they were told that brandy, as a rule, was exceptionally rich in fusel oil, for fusel oil has for many years past been associated in the public mind with all that is undesirable in spirituous liquors. Nor would it help to call in the assistance of furfural, which is poisonous, nor of aldehydes, which are irritating and obnoxious. As brandy, however, doubtless occupies a high position in the public opinion, and as the main

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impurities present in it cannot possibly be considered in any favourable light, especially from a medical point of view, it is but a small step to attribute to the ethers virtues which they probably do not possess, or for the possession of which not a particle of scientific evidence has ever been brought forward. In the various cases which have been before the police-courts of late, an important feature of the prosecutions was the evidence of medical men who spoke eloquently about the medicinal properties of brandy, which were alleged to reside in their ethers. As a matter of fact, all unrefined spirits, no matter from what source, are comparatively rich in ethers. The difference in the ether content of brandy and of whisky is often insignificant, whilst the quantity in rum is frequently very high. It is highest of all in the very commonest of brandies made from the residues, the skins and pips of the grapes from which the valuable juice has been expressed. In spite of medical opinion, there is no doubt, to my mind, that the effects of a spirituous liquid reside in its alcohol, and for all practical purposes in nothing else, and that the function of the "impurities" is solely to give to the otherwise flavourless alcohol that zest which human beings require in all they eat or drink. It is quite well known that the best and most nutritious of diets is not tolerated unless it is properly flavoured. Dietaries that have been constructed with a disregard of that fact have led before now to catastrophes among prisoners and soldiers, and culminated in deaths. As a machine will not run without lubricant, although the latter adds nothing to the power, so the flavour of food or drink facilitates the work of the animal machine. The consumer must "like" his food for it to agree with him. The one may prefer the flavour of whisky, the other of brandy, as regards his beverage, but a chemical and scientific explanation cannot be given.

For years the impression has prevailed that brandy was a more healthful beverage than any other spirituous liquid on account of its erroneously presumed purity. We now know that, if anything, brandy is an impure material. There was a time when physiologists believed they could calculate and express numerically the toxicity of an alcoholic beverage, the amounts of aldehyde, furfural, some of the esters, and some of the higher alcohols necessary to kill an animal having been determined and calculated into kilogramme-factors by Dujardin-Beaumetz, Audigé, Rabuteau, and others; thus the quantities expressed in grammes necessary to kill 1 kilogramme of animal amount for ethyl aldehyde to 1.00 gramme, for acetic ether 4.00 grammes, for "higher alcohols" 1.40 grammes, and for furfural 0.24 gramme. Mastbaum, calculating the toxicity for a comparatively pure refined wine alcohol, with the "coefficient of impurity" of 175.7, and for a very impure brandy with the coefficient of 977.2, concluded that the "impurities" contained in 100 c.c. of these ("anhydrous") beverages would respectively kill 63.7 and 342.0 grammes of animal. This is disregarding the toxicity of the ethyl alcohol itself. According to Dujardin-Beaumetz and Audigé, this is 7.5, and 100 grammes of alcohol kill 12.9 kilogrammes. When this is allowed for, the toxicity of the two samples in question comes to 12,963 and 13,242 respectively—that is to say, the difference is altogether immaterial. It is clear that the toxicity of an alcoholic liquor belongs to the alcohol, and practically to nothing else.

We cannot escape the logical conclusion which was arrived at some years ago by the Departmental Committee on "Whisky," that pure alcohol—that is to say,

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silent spirit—is, if anything, a more healthful beverage than the ordinary drinking spirits—all *barring the necessary flavour*. Everything turns upon the latter. The importance which the consumer attaches to the origin of a spirit is infinitely less than that he attaches to the flavour. I am quite aware that I am uttering an unpopular heresy, but the clear outcome of recent analytical work with spirits proves up to the hilt that, broadly, the best-flavoured and the most valuable spirits are the least pure. Nevertheless, it may be true that the cheapest spirits are the most noxious, not because they are the most impure, for the purest spirit (silent spirit) is the cheapest of all, but just because for a given sum of money a larger amount of poison—that is to say, of alcohol—is obtainable in the one case than in the other. A gallon of “silent spirit” without the duty costs but a few pence, and cognac brandy as many pounds. No wonder that a given money value of the former can prove a poison where the latter imparts but the flavour to a cup of coffee. The subject is surrounded by a nimbus of popular prejudice, and it is comparatively easy to convince a magisterial bench that the vendor who supplies “silent spirit,” which, largely because it is foreign and cheap, is credited with poisonous properties, injures the health of the community. Nevertheless, it is clearly against the spirit of our legislation to substitute one thing for another. If the health of the purchaser is not prejudiced, it may be that his pocket is. Of few things, however, the ordinary person is more capable of forming a correct judgment than of his drink, and we Public Analysts, I fear, can do but little at present to assist him in forming a judgment as regards derivation and quality. By the various prosecutions we have not only not assisted the purchaser, but an effect quite contrary to that intended has been produced. Just as certain regulations on the Continent have led to the appearance of a multitude of brandy-flavouring preparations, the analyses of scores of which have been published in Koenig’s book, so a brandy-ether industry has commenced to flourish in England. I have it on the authority of one of the manufacturers himself. I also know from a large “brandy” merchant that so-called very cheap brandy is now sold with a guaranteed content of what they call “80 per cent.” of ethers.

In view of the facts set forth above, it behoves Public Analysts to be cautious. It is their function to protect the public from fraud and to insure that the purchaser gets what he has a right to expect; but they must not go one tittle outside their knowledge of the facts. As scientific advisers, there must on no account be any pretence that something can be done by analysis which is beyond the chemist’s knowledge. There is, it seems to me, some danger that zeal in the public interest may lead some analysts to take that course.

The names of articles of food and drink do not necessarily apply now to the selfsame substances as formerly. Beer was undoubtedly for a long time a malt and hop beverage; whisky, equally without doubt, was a product of fermented malt-wort. They are not so now. The product may be the same, or may be deemed by the public to be the same, but the raw material has changed. The time may come (I personally rather think that it will come) when brandy will mean only a brandy-flavoured alcohol, no matter from what source that alcohol is derived, just as the term “whisky” at the present time is legitimately applied to a whisky-flavoured fluid not necessarily made from malt. Public Analysts, by premature action based upon imperfect knowledge, are much more likely to hasten the advent of that time than to prevent it.

DISCUSSION.

The PRESIDENT (Mr. Fairley) said he was sure they were all indebted to Mr. Hehner, whether they agreed with the views he had formulated or not, for the great care and trouble which he had taken in preparing this paper. He himself had not had any samples of brandy submitted to him for this purpose, and formerly he had tested the alcoholic strength and general characters of the distillate and the amount and nature of the fixed residue. As he had not had any samples, he thought he might claim to take up a more neutral position and to speak somewhat as an outsider. The Sale of Food and Drugs Act spoke of "the nature and quality of substances demanded" and of "prejudice to the purchaser," which meant that the purchaser should get what he reasonably expected to get. The ordinary purchaser had little knowledge of many of the articles he consumed. His idea might be founded on prejudice or on bygone experience, but he (the President) thought that when all was said and done, whether or not they adopted the views of Mr. Hehner, the purchaser, no matter how ignorant he might be, had some right to get what he expected to get. Mr. Hehner admitted that the time was when all brandy sold in this country was cognac brandy. With the extension of commerce and of the cultivation of the grape in various countries, and with the improvements in the methods of fermentation and distillation, came a variety of liquids whose status had now to be decided. Some of these points were defined in Circular No. 18 recently issued by the United States Department of Agriculture, drawn up by Dr. H. W. Wiley, the Chief of the Bureau of Chemistry of the Department. Brandy (potable brandy) is the distillate from wine, properly aged by storage in wood to eliminate the greater part of the fusel oils, etc., which may be present. Brandy should not contain less than 45 nor more than 55 volume per cent. of alcohol, and not more than 0.25 per cent. of total solids (extract). The content of fusel oils should not exceed 0.25 per cent. Brandy should not be mixed with alcohol from any other source than that of distilled wine. The distillate from the lees, pomace, and refuse of the winery is not entitled to bear the term "brandy" in the potable sense. "Cognac" is only admitted as a name in the case of brandies made in Cognac from wines grown and manufactured there. No artificial colour other than that derived from the wood in which they are aged is admitted in brandies. One question was, had the Public Analysts who had brought this matter forward exceeded the reasonable limits of their duty? He knew of cases where very considerable pressure had been brought to bear on certain Public Analysts to go into this matter. He had very great sympathy with such cases and with those who were honestly trying to do their duty in dealing with the matter. Only by continuous effort could improvement be attained, as was well shown in the analysis of butter and even of milk.

Mr. FISHER said it had become necessary to form an opinion and take a line in this matter, and the responsibility was on him, as on others, of saying whether certain samples purchased under the Food and Drugs Acts were to be accepted as brandy. Some samples containing a very low proportion of acids, ethers, etc., were alcohol slightly coloured and flavoured, differing entirely from cognac, and had no title to be called brandy. Others had the flavour and odour of brandy, but showed a deficiency in certain constituents. Such samples were probably mixtures or blends

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of cognac with rectified spirit, which might have been made from grain, beetroot, or other material, and if the mixture could be proved, they were not genuine brandy. It could not be maintained that a grape brandy might be mixed with whisky or gin (if that were possible, apart from the flavour) and the blend sold as brandy. He must admit, as Mr. Hehner had stated, that it was not always possible to detect the origin of the alcohol when blended in the brandy; yet when alcohol had been produced by rectification from grape spirit it was a debatable point whether it became brandy by being mixed with another proportion of actual grape-brandy. He did not, however, believe that in nine-tenths of mixtures met with the alcohol was exclusively derived from wine. They were, in fact, compounded partly of what everybody would regard as brandy, the other spirit being what nobody would admit was brandy. Mr. Hehner's remarks indicated the need for careful examination of these cases, and assertions must not be made which could not be substantiated. He did not regard this as a question of the differences in composition shown by the varieties of brandy made in Algiers, Greece, Spain, or Australia. Each had, of course, its own characters. He had given his opinion on samples which were afterwards admitted to be mixtures, and he had examined samples which were labelled and sold as mixtures. With reasonable care and precaution, he thought it possible to certify that a sample was genuine grape brandy or that it was a blend of the kind described.

Mr. A. H. M. MUTER thought that it would be a great pity if the Society of Public Analysts came to the conclusion that they were unable to deal with this question. He thought it would be far better that an effort should be made and a standard fixed, as had been done in the case of milk.

Mr. GORDON-SALAMON said that they must start first of all with the question which was the subject of the paper, namely, What is brandy? He thought the fact had to be accepted that the public regarded brandy as spirit derived from the grape, and in giving evidence he should certainly support that view and no other. If he were correct in assuming that position, then the question for the analyst to determine was whether by analytical methods he could say "Aye" or "Nay," is the public getting that article? Arising out of it was the further question—Does the present state of our knowledge permit us to come to a definite and reliable decision in respect of such a question? With all respect to the President, he (Mr. Salamon) did not agree with the view expressed, which in effect said: "Do not let us be discouraged. If we have not yet got to perfection of knowledge, we shall later." But meanwhile vendors were being prosecuted, and evidence was being given by public analysts to the effect that such and such samples were adulterated with spirit not derived from the grape, when at that meeting members were expressing grave doubts as to their being justified in making such a statement. In his opinion, that was a position which did not reflect credit on the Society, and until they were provided with some definite and proper method of analysis (which was approved by the profession as a whole) they ought to be extremely careful in making statements upon oath before magistrates, who would naturally look to them for guidance. On the other hand, one had to examine into the origin of this question. Mr. Hehner had very properly mentioned that it was due to the scarcity of brandy during the phylloxera ravages, and those who had investigated the manufacture of brandy, as he (Mr. Salamon) might

claim to have done, in some at least of the countries of its manufacture, knew that adulteration with grain spirit was very largely practised. He knew as a matter of fact that very large quantities of grain spirit had in the past been employed for the adulteration of brandy. He thought the practice was reprehensible, and should, if possible, be stopped. Therefore, he was one of the first to admit, as the result of his own personal knowledge, that brandy was subject to adulteration with grain spirit, and that the public very often did not get what they demanded in the shape of brandy. But that being admitted, the next question was, Could it be determined by analysis whether or no such addition had been made? Now, what was the condition of the grain spirit as usually employed? It was nearly always pure rectified spirit—as pure a spirit as could be found—and purchasers were extremely careful in their choice of such spirit. Assuming also that brandy was to be derived from the grape, was it justifiable to add distilled grape spirit to that brandy, or must brandy be absolutely the untreated product of distillation? Was it allowable to add spirit derived from the grape in the pure state at a later stage? In answering that question one must not forget that it was the common practice of the French brandy manufacturer to add pure spirit at a later stage, and to the bulk of the brandy sent from France pure spirit was frequently added, and often in very considerable quantity. Therefore, in seeking to determine the origin of the spirit and the terms of its purity, could an analyst say “Aye” or “Nay,” as to whether that spirit—assuming it to be rectified spirit—had been derived from the grape or from grain, or from any other source? Mr. Fisher had clearly answered that question, and he (Mr. Salamon) held exactly the same view. It was absolutely impossible to make such an assertion. If that were the view of that meeting, if that were the view of public analysts as a whole (and he did not see how they were to come to any other conclusion), what became of the whole question? Assuming a spirit—a brandy—containing 150 parts of esters per 100,000 of absolute alcohol were in the course of manufacture diluted down with rectified spirit until the esters were below the stupid standard of 80 by perhaps 5, who could say whether that had been legitimately brought about by the addition of pure grape spirit or whether it was due to the addition of grain spirit? And if that could not be determined, how could it be said whether the brandy had or had not been derived from the grape. If one denied that issue, one was thrown back upon the one which did not obtain in practice—namely, that no addition must be made to the brandy after distillation. The articles published in the *Lancet*, if he might venture to say so, did not reflect credit on the leading medical journal of this country, because the expert who made the investigation, competent as he was in many respects, had confined his visit to Cognac, and the report of the so-called Commission favoured the impression that it dealt with the whole question of brandy upon a broad basis. He (Mr. Salamon) did not think the expert knew of the existence in France of many thousands of *bouilleurs de cru*, small farmers who were permitted by special legislation to make brandy from their own cultivated grapes, if they so desired. They were allowed to distil the spirit from their grapes instead of having to put an inferior wine upon the market. That permit had been inaugurated by the Government. Such brandies were sold, and many of them went into the Cognac district itself, and did so to this day, although the law had been altered in respect of their production. On analysis, such brandies, having been distilled, not in pot stills, but in nearly all cases by various modifications

of the patent still, showed a great range of composition, which was absolutely different from the composition of pot-still brandy as it was made in Cognac. Yet those brandies were genuine spirits derived from the grape. Spanish, Algerian, and Australian brandies were absolutely in the same category, and only a relatively small proportion of the total brandy produced came from Cognac itself. Consequently, it was unfair to set up a standard, even assuming it could be supported by analysis, which only applied to one portion of the brandy-producing area, and that by no means the largest. Supposing, however, this standard were accepted, would it not result in opening the door to sophistication? What easier than to construct a brandy that should answer the standard requirements of the magistrate—to make it up to contain the requisite proportions of ethers, furfurol, aldehydes, etc.—and then send it out under the certificate of the public analysts of this country as a pure article? Mr. Hehner had said that a spirit might be judged by taste as well as, or even better than, by analysis; but he (Mr. Salamon) thought that they must be very careful in making such a statement. It might certainly be left to the taster to say whether the public would accept a brandy, and how much they would pay for it; but he (Mr. Salamon) did not think it could reasonably be left to him to say whether a brandy had been broken down with rectified potato, grain or grape spirit.

Mr. C. G. Moor said that he spoke with a certain amount of trepidation, because his views were to a large extent opposed to those of Mr. Hehner, who had considerable advantage over him in point of knowledge of the literature of the subject. He thought everyone would agree that brandy had, in the past at any rate, possessed a considerable reputation as a medicine. It was referred to in the British and many of the other present Pharmacopœias, and was in some of the earlier editions also. It was in the American Pharmacopœia, which gave a long list of tests to provide against sophistication; and it would also be found in the Austrian, German, and Hungarian Pharmacopœias, in the Dutch Supplement, and in the Swiss Pharmacopœia. The making up or “faking” of brandies by colouring silent spirit was certainly regarded as an adulteration in Canada. The Government Analyst there, in one of his bulletins, stated that the existence of this manufacture had long been known, but that it was only recently that the various ethers, etc., had been offered publicly for sale. Regarding the value of the ethers and their interpretation, the view which he (Mr. Moor) held was that the 80 parts of ethers per 100,000 of alcohol was simply a working standard, just as long ago 2·5 per cent., and then 2·75 per cent., and now 3 per cent., was a working standard for fat in milk. Even now it was perfectly well known that a great deal of milk was “let down” to the 3 per cent. limit, but, nevertheless, it did provide against, and formed a working basis for detecting, the worst adulteration. It was in this way that he thought they should do what they could in regard to brandy, rather than follow what might rightly be described as a policy of despair. He thought, therefore, that they must have some kind of standard, and that the 80 parts of ethers per 100,000 might be used for the moment. He ventured to think that in the case of brandy of any well-known make a sample manufactured before this agitation arose would contain over 100 parts of ethers per 100,000. It was perfectly clear, of course, that ethers could be added to silent spirit suitably coloured, and that such an article would pass the suggested standard as regards ethers; but it was quite obvious that samples containing

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as little as 20, 30, or 50 parts of ethers per 100,000, were not genuine brandy. He regarded brandy as the spirit derived from the grape in a pot-still, simply because that was the origin of brandy before modern methods were introduced. There was one condition, however, under which the proportion of ethers might fall below an arbitrary standard. When brandy was made from "sick" wines it was customary, he believed, to throw away the first part of the distillate, because it was nasty and could not be mixed with the rest, and because, the distillation being carried out in a country where there was no alcohol regulation, it did not matter about a portion of the distillate being thrown away. About a month previously he had been permitted to read a paper on this subject at a meeting of the Therapeutical Society, at which were present several of the most prominent medical men of the day; and he had particularly invited an expression of opinion as to whether there was really any physiological action or advantage in a good genuine brandy, or in a good wine or whisky, apart from the alcohol present. He had been surprised to find that none of the medical men would specially advocate brandy, or say that there was any advantage in having matured spirit. The question from the point of view of the Public Analyst seemed perfectly clear. The purchaser was entitled to be supplied with what he asked for, and anyone, whether educated or ignorant, wanted in the case of brandy what he believed to be the genuine article, and not artificially coloured silent spirit.

Mr. JOHN HERON said that probably an expert in spirits would be able to distinguish between wine-spirit and grain-spirit by some similar method to the one he had himself employed for many years for distinguishing between beet and cane sugar. There was a subtle something clinging to the refined, rectified article which stamped it at once as to its origin.

Mr. SALAMON: Whether it is pure or mixed with brandy?

Mr. HERON said that the difficulty that arose in the case of a mixture was that the constituents or impurities of the brandy would (and, indeed, must) belong to the same order or quality as those contained in the grain-spirit, so that it would probably be a difficult thing to attempt; but just as, in the case of sugars, the presence of an admixture (though not its quantity) could be detected, he should think it ought to be possible, after some experience, to tell whether grain-spirit had been added to brandy. He had hoped that at that meeting some understanding might be come to as to what ought to be the necessary constituents of brandy. However, anyone who had been experienced in the analysis of brandy and other spirits would, in the very handling of the liquid, come to know instinctively whether a particular sample was genuine brandy or not. He did not think that a right judgment could be formed on the basis of one constituent only, but by comparing the different constituents one with another a very fair opinion could be arrived at as to the quality of the brandy.

Mr. J. B. P. HARRISON said that the question of the sale of "British brandy" was an interesting one. Some Public Analysts held that there should be no such substance as "British brandy," as the term "brandy" in this relation was a misleading one; and as the chief consumers of this kind of spirit were not sufficiently educated to distinguish between it and actual brandy, the question was whether the purchaser knew what he was really receiving for the price he paid. He was also

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of opinion that so long as the Excise recognised the sale of spirit in the guise of "British brandy" as a legitimate source of revenue, there would always be confusion as to what was really genuine brandy.

Dr. SCHIDROWITZ said that he felt some little difficulty in speaking on this question from a purely analytical point of view, because, regarded in that light, it resolved itself into a series of metaphysical speculations. If he were to ask himself, —What is brandy from an analytical point of view?—he should reply that he did not know; and he thought they were all in that position. He did not quite agree with Mr. Hehner about the literature of this subject. He thought that the literature on the subject of brandy upon which one could actually pin any faith was very small indeed; and he did not agree that it was an impossible matter to practically substantiate the genuine character of a spirit. So far it had certainly not been done, and, whether one regarded the analyses of Girard and Cuniasse, of Mastbaum, or of any of the other observers mentioned, none of those analyses, as far as he knew, represented samples taken at the still-head. The grape, of course, could not be traced all through its growth up to the time when it was pressed and the brandy made from it, but there were practical conditions—it was not necessary to make a special plea in any direction—under which samples might be taken so as to enable it to be shown within what limits the different qualities and types of brandy did vary. That had not been done, and he must say that, until it had been, the industry and trade concerned had themselves largely to blame for the position in which they now are. He did not quite agree with Mr. Hehner's classification of the by-products. His view was that, in addition to the substances mentioned by Mr. Hehner, there were many others about which, generally speaking, little is at present known. In saying this he was not speaking merely as a matter of speculation, but from various facts which he had observed, and which led him to say that there certainly were such substances. Another question was—What is brandy, looking at it from the point of view of the manufacturer, and not from the point of view of the analyst? After all, the chemist should not consider himself merely as a person who put things into a test-tube and took them out again, but he could be, and was, an aid to great industries and trades; and therefore he thought that this matter should be looked at from the point of view of the industrialist also. If it were said that brandy was anything distilled from the grape, whatever the degree of rectification, he would put this case: Supposing grape spirit to be rectified to the point of absolute alcohol, and to be coloured with burnt sugar, bottled and sold—

Mr. CHAPMAN: People would not drink it.

Dr. SCHIDROWITZ, continuing, said that the question arose—Was such an article brandy or not? The purchaser said he did not think it was brandy; the analyst expressed an opinion, right or wrong; but, broadly speaking, they were all agreed that such an article was not brandy. Where, then, was the limit to be set? He was not going to express any opinion as to the type of still that should be used, or as to the degree of rectification that should take place, because the matter, regarded from a purely scientific point of view, was in its infancy. At the same time, he thought it a mistake to go to extremes in either direction. With regard to the toxicity of the higher alcohols, he might mention that the kilogramme factor for the alcohols in general, according to Dujardin-Beaumetz, varied from about 6 for ethylic

alcohol to 1·5 for amylic alcohol. He must say that he was strongly opposed to judging any fermented or distilled liquid on a single analytical figure. He did not say that in years to come it might not be possible in many cases to form an opinion by purely analytical means as to the character of a spirit, but he ventured to think that it would never be possible to do so on the strength of a single analytical figure. The case of wine analysis might be instanced. Standards had been set up by the German Government on the strength of many thousands of analyses, and yet, since those standards had been set up, cases had occurred of genuine wines which were entirely outside the limits. He had met with German white wines which he knew to be absolutely genuine, but which, by the official methods, showed no tartaric acid at all. Some white wines, again, contained about twice as much glycerin as white wines of a similar class usually contained, the high content of glycerin being perfectly characteristic of the particular wine in question. Anyone relying on a single analytical factor might find himself in the position, with a sample yielding abnormal figures of that kind, of causing a prosecution when the article was perfectly genuine. He (Dr. Schidrowitz) thought that nothing further was needed to demonstrate the absurdity of proceeding in that way. He had seen many certificates in which samples were stated to be genuine brandy on the strength of the analytical figures. He had not been studying this matter for the last few months only, but had been working on spirits for a number of years, and would never give an opinion as to the genuineness of a spirit on analytical figures alone, though it might in some cases be possible to say that it was not genuine. But the sense of taste could be so trained as to work in association with analysis, and then very often the chemist could do something useful; and even at the present time he could do a great deal if he worked in conjunction with an expert taster. Moreover, he could assist the manufacturer in his processes of fermentation, distillation, etc., and he could assist the trade with regard to blending, fining, and various other questions. Finally, the chemist could act as a policeman, but he did not think the chemist should confine himself to that rôle entirely. If an article was not genuine they were all agreed that speedy steps should be taken, though what those steps should be was another matter. He must demur to the statement in the American circular which the President had quoted, that brandy should "be properly aged in order to remove fusel oil," because, whatever it was that disappeared in the maturation of spirits, it was, in his opinion, practically certain that it was not the higher alcohols. In his own experience he found that old spirits contained on the whole rather more fusel oil than new spirits, and, theoretically regarded, there was no reason why they should not. This statement, however, with regard to fusel oil had been handed down from generation to generation, until at last it had come to be believed. With regard to the medical opinions which had been given from time to time with regard to brandy, he had been trying to discover the record of any scientific physiological experiments on genuine brandy, whisky, or any other spirit, side by side with plain alcohol, but there were no such experiments; and even if a medical man recommended genuine brandy, he did not know what would happen if some other spirit were tried. He (Dr. Schidrowitz) agreed that the effect produced was mainly due to the alcohol, and to nothing else; but he held the view that, where special and beneficial physiological effects, which could not wholly be credited to the ethylic alcohol, had been

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produced, these were to be ascribed rather to the age of the spirit than to its original character.

Dr. THORNE said that the fact rather seemed to have been lost sight of in the course of the discussion that a standard had been more or less officially put forward, and that the number—80 parts of ethers per 100,000 of spirit—had become more or less fixed in people's minds. It seemed to him that, as a Society of Public Analysts, they ought carefully to consider whether they were justified in letting that stand for present use. Whether they might eventually come to the conclusion that brandies when properly made might be above such and such a standard was a point which might develop as time went on; but he thought it an undoubted fact that at the present time really pure brandies did not all contain ethers up to the standard of 80 parts per 100,000, and that therefore to make that one point an absolute standard was an injustice on the one hand and a great danger on the other. Although he was not personally connected either with public analysis or with the spirit trade, he happened to know that at that moment there was a large consignment of real Cognac spirit which had been in England for something like ten years or more, and which had been bought at a high price with the best expert authentication, but which on analysis showed only 67 parts of ethers per 100,000. That was a spirit which had cost originally certainly seven or eight times the price of many spirits that would be passed on the standard of 80, and was really a very fine Cognac. The danger, on the other hand, that imitation brandies might be made up was, of course, one to be fought against; but there was a very great danger that, if this one particular standard were fixed at a point which was higher than was fair, really good and sound brandy would be condemned, and there would be a tendency to add small quantities of ethers, not for the purpose of making really sophisticated brandy, but in order to bring real brandy into a safe position with regard to police-court proceedings. That was undoubtedly a serious danger, and he thought, therefore, that the Society ought to go so far as to take the position that at the present time the ether standard of 80 parts per 100,000 was not justifiable, and ought not to be maintained as an absolute legal test of good brandy.

Mr. BEVAN said that he could confirm what Dr. Thorne had said, having had occasion to examine a sample of 1848 brandy which showed only 57 parts per 100,000 of ethers.

Mr. CRIBB said that, with regard to the adoption of the standard of 80 parts per 100,000 for the ethers, that nobody intended that to be taken as a rigid standard, but simply as a basis for calculation. Nobody would dream of prosecuting for 67, for instance, or any figure nearly approaching 80. In all the cases that had been brought into court the ether figures had been very much lower—as far as we knew, never more than 40. In those cases in which he was concerned they were very much lower—some lower, even, than those yielded by samples sold as "British brandy." It must be borne in mind that 80 was very far from being the average figure. The average proportion of ethers shown in the analyses by Girard and Cuniasse, and also by Vasey, was something like 136, and if Marc brandies were included it was about 180.

Mr. HEHNER: That was for cognac.

Mr. CRIBB: That in France is the same thing as brandy in England.

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Mr. HEHNER: May I say that "cognac" in French and in English is "cognac"; "brandy" in French is simply "eau de vie"?

Mr. CRIBB said that he had been in a great many hotels in France, and had never been asked to have anything but cognac. The term "eau de vie" was never once used in his hearing, and it was notorious and openly admitted that the stuff offered as "cognac" for use with coffee might be anything. He was quite sure that in France the word "cognac" was used in the loosest possible manner. If the average was as high as 136, it was quite obvious that the number of cases in which genuine brandy came much below 80 must be very few indeed, and, as a matter of fact, amongst all the analyses of Girard and Cuniasse and of Vasey there was only one. He should like to ask Mr. Hehner if he could tell him the number in the papers by Windisch and others to which he had referred.

Mr. SALAMON thought it might interest the meeting to hear that a couple of weeks previously he had had, from one of the largest importers of brandy into this country, two samples which he had to report upon as being below 80 in ethers, and therefore not capable of passing the magisterial standard. His clients had thereupon sent him a letter, accompanied by a report from the French Government authorities, stating that those brandies (as a special matter) had been prepared under Government supervision. A certificate of origin and a certificate of purity were also produced, in which it was declared that both brandies were pure grape brandy.

Mr. CRIBB said that he did not dispute for a moment that samples did come below 80, but the number was very few indeed.

Mr. HEHNER said that there were scores of cases. In a report made by the *Lancet* commissioner himself three samples of Algerian brandy were shown to contain respectively 62·73, 47·6, and 55·3 parts per 100,000 of ethers; and the report continued: "The figures coincide with those obtained with genuine, though somewhat young, brandies." These Algerian brandies consisted of spirit derived entirely from the grape. Thus, the same authority that had fixed the standard of 80 had also fixed the standard of 47.

Mr. CRIBB said he should like to mention that Algerian and Spanish and most other brandies grown out of France had a very different flavour from that of French brandy, and would hardly be recognised as brandy by regular drinkers of that spirit.

Mr. SALAMON said that the brandies he had spoken of came from France.

Dr. SCHIDROWITZ remarked that the "certificate of origin" applied to anything, whether absolute alcohol or brandy, that was distilled from the grape.

Mr. CRIBB said that a good deal had been heard about rectified grape spirit, but he had never seen any published analyses of it, and should be pleased if Mr. Hehner could refer him to any. He had been himself trying to obtain samples of it, but had only succeeded in getting one, which contained 67 parts of ethers per 100,000. Possibly that was abnormal; if not, it showed that the presence in a brandy of rectified spirit derived from the grape would not seriously affect the validity of the ether standard if judiciously employed. With regard to Mr. Hehner's remarks to the effect that the value of brandy and of all spirits consisted entirely in their flavour, and that no value in the present state of knowledge could be attached to any one of the analytical constituents, it seemed to him (Mr. Cribb) that, if they were to go merely by flavour, any concoction whatever, as long as it tasted right, would pass

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muster, no matter how it was made. That, however, was entirely contrary to the spirit in which they had hitherto carried out the requirements of the Sale of Food and Drugs Act. With regard to the article in the *Moniteur Officiel*, of course everything depended upon what one accepted as being genuine brandy, and it seemed to him that even in France the question must be a very difficult one unless the manufacture could be followed all through. One difficulty arose from the use there of portable stills, which were carried about the country to anyone who wanted to employ them. It was quite obvious that brandy made in that way might be subject to all sorts of admixture, for there could be very little control over it. He did not know how far an Inland Revenue officer went round with the stills, but from what he had heard he did not think that that was done. It had been remarked that the laying down of a standard had a most unfortunate effect in opening up the way for adulteration; but surely the absence of any standard at all would do this to a much greater extent. With regard to the question of tasting, Mr. Hehner and Dr. Schidrowitz were apparently in conflict. In all the cases that had been at all fought the evidence of the taster had been called in, and had confirmed the opinion of the Analyst. He did not see how anybody at the present time could say that a sample was genuine, but in some cases it was possible to say that one was adulterated, and with greater confidence, of course, if the analytical evidence were supported by that of the palate.

Mr. CHAPMAN thought that this question emphasized in a very marked degree the necessity for the establishment of a Consultative Board or Court of Reference such as had been recommended by a Royal Commission and by a Select Committee, and more especially a Board constituted in the manner indicated by Dr. Thorpe in the Minority Memorandum which he had signed in connection with the Royal Commission on Arsenical Poisoning—viz., a body including not only scientific men, but also manufacturers and others possessing special technical knowledge. Not only was it unfair to the Public Analyst to compel him, as is very often the case, to set up standards for himself, but such a proceeding was extremely undesirable from every point of view; and he hoped that before long this function would devolve upon a Government Department possessing the necessary facilities for obtaining such scientific and commercial information as might be necessary for the purpose. Mr. Hehner had in his opening remarks made a very clear and lucid statement; and he (Mr. Chapman) cordially agreed with a great deal that Mr. Hehner had said. He would, however, like to take the opportunity of expressing his dissent from the view which had been put forward in some quarters that brandy might practically consist of anything which looked and tasted like brandy, and which was analytically indistinguishable from that spirit. He (Mr. Chapman) thought that was a position which many of them would hesitate to take up, for it was one which, if carried to its logical conclusion, would lead to such assertions as that a mixture of glycerides similar to that occurring in butter, and incapable of being distinguished from butter by chemical analysis, might, if it possessed the requisite flavour, be sold as butter without prejudice to the purchaser. He felt that was an extremely dangerous position to adopt. The main point in connection with that meeting centred very largely in the answer to the question, Were they in a position to make statements such as were being made and sworn to in courts of law in reference to samples of

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brandy examined under a Criminal Act? So far as he was able to judge, he thought that the general feeling of that meeting was that they were not justified in making such statements. He thought there could be little doubt that the demand for ethers was very largely due to their supposed stimulating and medicinal effect. He was certainly not prepared to say that the ethers did not possess such valuable properties, but he did feel that it was an absurdity to demand that a spirit, the great bulk of which was used as a beverage, should conform to a certain analytical standard merely because a certain small proportion was used for medicinal purposes. It was for the Pharmacopœia Committee of the General Medical Council to see if they thought proper that brandy sold as a drug should conform to some required standard; but for the rest the purchaser must, and would eventually, be the judge as to whether what was supplied to him was good value or not. If it should become possible to distinguish analytically between grape spirit and that which was not grape spirit, well and good; but to insist that all brandy should conform to one analytical standard was about as absurd as it would be to demand that all clarets should conform to the analytical type of a Château wine. Mr. Heron had raised an interesting point as to the possibility of distinguishing between alcohol from different sources. He (Mr. Chapman) believed it to be a fact that alcohol obtained from grain, even when very highly rectified, if added to wine, could be readily detected by the trained palate, whereas alcohol obtained from wine was capable, on the other hand—to use a wine-merchant's expression—of “marrying” or blending perfectly.

Mr. CRIBB, in reference to what Mr. Chapman had said as to the ability of the taster to distinguish between grain spirit and grape spirit, said that he knew of a large London buyer of Spanish wines which had to be fortified by the addition of spirit who had inserted in his contracts with the foreign producers a special clause providing that no grain spirit should be added; and he professed to be able to tell at once by the taste whether grain spirit or grape spirit had been added.

Mr. HEHNER, in reply, said that he considered it to be entirely within the right of the State or its representatives to say, as guardians of the public, “We will only permit a thing to be called brandy if it conforms with certain arbitrary regulations which we, the Government, have a right to lay down.” The State could exclude, if it chose, anything, although it might be legitimately made, from a particular source, and could say that it should not—in England, at any rate—be called brandy. The State could say if it chose: “We insist upon nothing but a certain quantity of ethers.” But he (Mr. Hehner) thought that it was not the business of the analyst to do so. The analyst had absolutely no right to do so, and only imposed upon the magisterial Bench by suggesting that he could do such a thing. There were, he reaffirmed, a very large number of analyses on record—well-authenticated analyses, made by competent people—which showed this. He quite agreed that those analyses were not all made upon the same standard, for it was notorious that the methods of determination, especially in the case of the higher alcohols, gave widely varying results. But the figures obtained by each method were more or less comparable among themselves, and if that condition were accepted it might be said that there were many hundreds of analyses on record, though, if the matter were regarded in the strict, scientific sense, the number of trustworthy analyses was very small. There were very many cases on record in which brandy fell, as regards ethers, below brandy of

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authenticated origin, and he agreed that this happened with much greater frequency in the case of brandies not of French origin. But these were not chemical curiosities, but articles of trade that were imported to the extent of tens of thousands of barrels, and when an article was once imported, the public analyst, at any rate, had no means of ascertaining whether it came from one country or another. When all these things were taken into consideration, it seemed to be absolutely absurd to judge by Cognac standards an article which was simply called "brandy," just as it would be absurd to judge all wines by the higher German standard, or to use in any other case a measure which was not applicable. He did not advocate a policy of despair, but he did not want analysts to bolster themselves up with fairy tales, and to say that which they did not at present know, but which they might know at some future time. However far one went, it would not be found that alcohol, from whatever source, was anything different from C_2H_6O . While, however, impurities attached to the alcohol, he fully believed that it would be possible, more or less, to distinguish by taste—not because the alcohol was different, but because the impurities were still there. That was the sense in which he had spoken when he said that one alcohol was as good as another. He quite agreed that sugar from the beet and sugar from the cane could be distinguished, even if highly refined, by the traces of the mother liquors which they contained; but it was not suggested that cane-sugar was different from beet sugar. A trade expert was perfectly entitled to go into court and express his opinion, which might be a perfectly correct one, but he (Mr. Hehner) thought that an analyst had no right to make a statement which was based on taste. His function was to analyse the article, and to judge it from the chemical and physical point of view. He (Mr. Hehner) fully agreed that the analyst was in very many cases quite right when, having found that there was a deficiency of ethers, he gave his opinion that the article was not ordinary brandy, because undoubtedly very many artificial mixtures were made. Such mixtures were often sold as "British brandy" in the first instance, and afterwards sold by the publican without the qualification "British." The analyst, however, could not possibly in such a case say for certain that the deficiency in ethers was due to any artificial addition; it might be due to natural causes, and he (Mr. Hehner) did not think it was fair that they as public analysts should take upon themselves to make a definite accusation when the variation was just as likely to be due to other causes. If anyone had actually seen anything added, he was, of course, at liberty to say so, but that was a matter for the policeman rather than for the analyst. The question had been raised with regard to other articles—the case of foreign meat and English meat for instance—and he could not see why the same principle which applied in that case should not be applied to brandy or whisky. It was not weakness to say that there was no scientific means of distinguishing; the harm was done by pretending to do that which could not be done. That change which had been experienced in all other departments of the spirit industry must, he thought, irresistibly come to be applied in time to brandy. He perfectly agreed with Mr. Fisher that nine-tenths of these deficient brandies were mixtures that had been artificially "let down," but he was perfectly convinced that there was not only no one single determination that would be of any assistance in distinguishing such mixtures, but that no possible combination of the determinations now available would be of any

assistance either. There were undoubtedly genuine brandies which were high in ethers and low in higher alcohols and *vice versa*; and there were undoubtedly genuine brandies which were very high in aldehydes and low in higher alcohols. In fact, all possible combinations existed in undoubtedly genuine brandies. Why should they, who knew really nothing officially about the preparation of brandy, because it was not a British manufacture, pretend to know more than those whose life business it was to watch the production? No Government could have been more interested than the French to keep the brandy industry a national one, but they had failed, and had acknowledged it. Their last Report, which he had ventured to quote, was to the effect that it was impossible to lay down any standard, because the impurities varied from 15 to 1,200. If there were any Pharmacopœia which gave information as to how to ascertain whether its requirements were complied with, he should be very pleased to see it. It was very well to lay down certain laws, and to say that brandy should be so-and-so; but the public analyst had to say whether it was so, and the complaint against the British Pharmacopœia was just that it laid down a set of laws which no one could comply with or enforce because the analytical data were wanting. If a Pharmacopœia stated that, for its purpose, brandy should contain a certain quantity of ethers (200 parts per 100,000 if they liked), let it be so; but that, surely, could not be a question of brandy for the public. His own feeling was very strong on the matter. He confessed that not very long ago he should have taken a diametrically opposite position, and should have said that brandy must undoubtedly be made from wine. It might be that he was wrong in altering his view, but he found that neither he nor anybody else in this or any other country had been able to do any better—that there was no means of distinguishing, and that the more analyses that were added, the wider the limits became. That might be called a policy of despair, but the real reason was that they could not fight against Nature. With regard to the question of asking the Government to fix a limit, the Government had known for many years that adulterated brandy was imported, but had never raised its voice. Blending had taken place openly, and the public might have cried out, but the Government had done nothing. Why public analysts should take upon themselves to do that which the Government had refused to do, and which, in the case of whisky, they had deliberately avowed themselves unable to do, passed his comprehension.

