affected by disease. Lord Justice Lindley went even further, and distinctly held that—since the Divorce Court exists for the protection of husbands and wives from each other's misconduct, and since the victim of recurrent insanity could not be confined in an asylum during the intermission of the disease—to allow this species of mental unsoundness to be a defence to a suit for divorce would be to negative the protection that the legislature intended to confer. If this ruling is upheld, the substantive law of insanity and divorce may now, probably, be stated thus:—Insanity is no answer to a petition for divorce unless (*a*) it prevented the respondent from knowing the nature and quality of his acts within the meaning of the rules in MacNaghten's case, *and* (*b*) is of such a character as to require the permanent incarceration of the respondent. The *authority* of MacNaghten's case will no longer be questionable in any tribunal short of the Privy Council and the House of Lords; but the *interpretation* of the phrase "know the nature and quality of his act" may still be open to forensic argument.

Gall-Stones in the Insane. By CECIL F. BEADLES, M.R.C.S., L.R.C.P., Assistant Medical Officer, Colney Hatch Asylum.*

Gall-stones are stated to be most common in females of advanced years by all writers on the subject, but is the frequency of their occurrence in such cases fully recognized? There is a further question, one which more immediately affects the medical officers at asylums, and which it is possible to have answered. Do gall-stones occur more commonly in the insane than in others, and is it possible for insanity to have any influence on the formation of biliary concretions?

The second question arises from the fact that in making post-mortem examinations on the bodies of the insane (females), I was early struck by the great frequency with which gall-stones were found, and accordingly commenced to collect them with a view to discover what relation, if any, they bore to insanity. Although my numbers are as yet somewhat small, still I think they may be of interest. I hope, however, that I shall have an opportunity later, with more data to hand, of giving further information on this subject.

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Out of 50 consecutive necropsies which I have personally performed on insane females at Colney Hatch, gall-stones were present in 18, that is to say in 36 per cent.

Now this percentage is exceedingly high, and, if maintained, is far greater than what is generally admitted, or, I believe, is possibly the universal case even in very aged women. That gall-stones are often met with in the insane after death is acknowledged by those who have made many examinations, but I know of no reference to this matter in any work on insanity, nor do I believe that insanity is a generally recognized cause of their occurrence. I do not wish it to be understood that I take it for granted, nor am I about to prove, that gall-stones are of a greater frequency in the insane than in the sane, for there are many factors to be taken into account when considering this subject, some of which I propose briefly to mention, although if this percentage were proved to be maintained it would, I think, show that there is some association between the two conditions.

There do not appear to be any trustworthy figures in existence of the frequency with which gall-stones occur whereby to compare these numbers. The most suitable subjects for this inquiry are, of course, the old people dying at workhouse infirmaries, for they belong to the same class as those that form the inmates of a pauper lunatic asylum, and have lived much the same kind of life. The result of an inquiry from the medical superintendents of several infirmaries was, as I had anticipated, that gall-stones in the very aged females were, at most, by no means uncommonly found after death, but unfortunately no record has been kept, and the percentage could not be given. My friend Mr. Dudley Cooper, however, who, whilst he held the post of medical officer at Highgate Infirmary, made over 200 very careful autopsies on men and women, and saw as many again, tells me that gall-stones were present in from 10 to 12 per cent. of the women. This he considered remarkably frequent. They occurred almost invariably in very aged persons. In the men gall-stones occurred in less than one per cent. of the cases. I may add that out of 63 post-mortem examinations made on females at the Cancer Hospital who had died of some form of malignant disease, at an average age of 49, there were only three cases in which gall-stones were found, and it is interesting to note that in each of these three cases the liver was the seat of a primary car-

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cinomatous growth. Moreover, although the liver in a large proportion of these 63 cases contained secondary deposits, yet in no other of this series was that organ primarily affected.

None of the medical text books in general use give figures, but Thudichum,* writing on the frequency of gall-stones, says—

> The question about the number of persons, members of a community subject to a census, who suffer from gall-stones, cannot, I fear, be answered. Assertions, therefore, concerning the frequency of gall-stone patients, the prevalence of gall-stone disease in certain districts, among certain classes, at certain times, must be received with great reservation.
>
> A physician who, during forty years, had been engaged in a most active practice, had made notes of nearly eighty cases in which he was consulted or found calculi after death.
>
> Wolff (Virchow's "Archiv.," xx., 1) observed 45 cases of gall-stone disease in living persons during a practice extending over forty-three years. Haller ("Opusc. Pathol.," p. 77) relates that, out of 230 bodies dissected in the anatomical theatre at Göttingen, two only had stone in the urinary bladder, but in 14 biliary calculi were found.

This last, which is the most suitable for comparison, is little more than six per cent. There can be no doubt but that gall-stones are of greater frequency, at any rate, in the old females in workhouses. But from what has been said I think we may conclude that a percentage of 36 is quite phenomenal. Of course it may be that there has been a singular run of cases, which will not be continued in anything like the same proportion, for it is a well-known fact in medicine, as elsewhere, that cases are apt to occur in remarkable series. Still, it will take a considerable amount of falling off to bring this percentage down to what one might call a more normal point. A remarkable statement, which I only mention for curiosity, has been ascribed to Heberden, that "in England few people attained their fortieth year without having been visited by gall-stones."

The 18 cases in which gall-stones were present are arranged in the accompanying table (pp. 386 and 387).

On referring to the table it will be seen that pneumonia was the most frequent cause of death. The first 10 cases died from complications following influenza. In only two, Nos. 12 and 18, can the end be said to have been sudden.

* "A Treatise on Gall-Stones," by J. L. W. Thudichum, M.D., London, 1863, to which work I am indebted for other observations.

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In the whole of the 18 cases, with the exception of Nos. 16 and 17, there was some cardiac hypertrophy and dilatation, although valvular disease existed only in these specially mentioned. In the same cases there was some degree of atheroma of the blood vessels, always marked in the arteries at the base of the brain. In all the cases the kidneys were granular, with the exception of Nos. 5 and 10, where they were apparently healthy. There were no renal calculi present. These remarks apply in a like manner to the remaining 32 cases examined. In the whole of the 50 cases there was some morbid conditions of the brain; all had more or less thickening of the membranes, dilatation of the ventricles, with excess of fluid, either hardening or softening of the brain substance, with, in some cases, hæmorrhages of old date—in short, all the brains were abnormal, and were such as are met with in the insane.

In Nos. 2, 3, and 17 there was no fluid present in the gall bladder, the walls of which were tightly contracted over the stones. In Case 9 the gall bladder contained a clear, colourless, viscid fluid, in appearance similar to glycerine, apparently mucus, about three drachms in amount, and in Case 10 there was a similar fluid, but less in quantity. In the remaining cases ordinary bile was present. The gall bladder of Case 11 was of very great size, and reached down to the umbilicus; it was six inches in length, and was connected to the liver by a cystic duct of equal length. The bile ducts in the liver were much dilated, and were filled with bile. The livers varied much in weight, but were more often considerably below what is usually mentioned as the average weight for that organ in the female, viz., 40-50 ozs. The average of 16 of the cases was a little more than 40 ozs. (No. 13, in which hydatid disease of the liver existed, not being included. The liver tissue in this was much atrophied, and a large cyst, the size of a cocoanut, was present in each lobe). In most of the cases the liver was distinctly fatty, and the congested condition, when present, was probably dependent on the mode of death. It will be seen from the table that, as would be expected, the gall-stones varied greatly in number and character, and, with regard to their composition, cholesterin occurred in not quite two-thirds of the cases, the rest being almost entirely made up of bile-pigment and mucus. From their size many of these stones must have taken a considerable time to form.

The majority of these 18 persons died at a great age; 11

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No.	Age.	Bodily condition.	Cause of death.	Form of Insanity.	Duration of Insanity.	Liver.		Gall-bladder.	Gall-Stones.			
						Condition.	Weight in ozs.		Weight in grains when dry.	No. of stones.	Composition.	Character.
1	75	Emaciated.	Pneumonia and heart disease.	Melancholia.	12¾ years	Congested.	35¾	Distended.	300	74	Bile pigment and mucus.	Vary much in size; 3 larger ones are an inch in diameter; the rest are small. Triangular, and with facets, vary from 2 to 74 grs. in weight. Of a pale yellow colour.
2	55	Emaciated.	Pericarditis and heart disease.	Mania.	½ ,,	Congested.	?	Tightly contracted over stone.	64	1	Cholesterin.	Size of pigeon's egg, with rough surface.
3	70	Well nourished.	Double bronchitis.	Recurrent mania.	30 ,,	Congested.	33¾	Entirely occupied by stone.	395	1	Cholesterin and bile pigment.	Measures 2½in. by 1½in., oval in shape, and has rough, irregular surface; greenish colour.
4	60	Fairly nourished.	Pneumonia.	Melancholia.	¾ ,,	Pale and fatty.	44	Not enlarged.	20	2	Cholesterin and mucus.	Size and surface like that of mulberries, but of a yellow colour.
5	81	Emaciated.	Pneumonia.	Melancholia.	24 ,,	Nutmeg.	33¾	Do.	34	1	Cholesterin	¾in. in diameter, rough, and of a whitish brown colour.
6	51	Well nourished.	Pneumonia and pleurisy.	Recurrent mania.	4 ,,	Fatty and congested.	40¾	Do.	24	4	Cholesterin and bile pigment.	Size of surface as of mulberries; deep orange in colour.
7	81	Emaciated.	Pneumonia.	Recurrent mania.	40 ,,	Small, fibrotic, and congested.	27	Very small.	90	1	Cholesterin	Size of pullet's egg, 1in. in length, rough, and dark brown colour.
8	85	Fairly nourished.	Pneumonia.	Senile dementia.	3½ ,,	Small, congested.	30¾	Not enlarged.	9	3	Cholesterin and bile pigment.	Like small mulberries, only of a reddish-brown colour.
9	42	Obese.	Pneumonia and heart disease.	Melancholia.	1¾ ,,	Fatty and congested.	49½	Do.	35	100	Bile pigment.	Very small, most vary from ⅛ to ¼ grain in weight; half-a-dozen larger ones weighing about 2 grs., one of which completely obstructed the cystic duct. Dull yellowish-brown colour.

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10	72	Fairly nourished.	Pneumonia and pleurisy.	Recurrent mania.	13½ years	Large and fatty.	66½	Small.	60	93	Bile pigment.	Vary from ½ to 2 grains in weight. Yellowish-white colour, with shining facets.
11	70	Much emaciated.	Phthisis.	Mania.	21½ ,,	Very small, fatty, congested in places.	26½	Greatly distended.	27	3	Bile pigment.	Of equal size; black shining facets, very soft, and crumble to pieces.
12	58	Fairly nourished.	Meningeal hæmorrhage pneumonia, and heart disease.	Recurrent mania.	9 ,,	Large, fatty, and congested.	46½	Not enlarged.	2	7	Bile pigment.	Irregular black masses of pigment of small size.
13	76	Much emaciated.	Heart disease.	Senile mania.	3 ,,	Hydatid disease, two large cysts replace much of liver substance.	98	Do.	4	1	Bile pigment.	An irregular black mass of pigment.
14	51	Obese.	Pneumonia.	Epileptic dementia.	1 ,,	Small and fatty.	33½	Do.	8	6	Cholesterin and bile pigment.	Small round stones of yellow colour, with rough surfaces. One was firmly fixed in the cystic duct.
15	71	Obese.	Pneumonia and heart disease.	Mania, followed by dementia.	4½ ,,	Large, fatty; fibrotic in places.	64	Distended.	192	460	Cholesterin and bile pigment.	Yellow stones with facets, mostly very small, the largest about the size of peas, and weighing 2 grs. each.
16	48	Extremely emaciated.	Phthisis.	Recurrent mania.	22 ,,	Fatty, soft, and congested.	32½	Not enlarged.	42	3	Cholesterin	Of equal size, and of a buff colour.
17	44	Much emaciated.	Phthisis.	Melancholia.	18½ ,,	Fatty, nutmeg.	47½	Small.	82	1	Cholesterin	Size of pigeon's egg, with rough surface and of a yellowish-green colour.
18	81	Emaciated.	Cerebral hæmorrhage.	Senile mania.	2 ,,	Small.	34½	Not enlarged.	27	13	Bile pigment.	Of equal size, with facets, and of a dark brown colour.

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were over 60 years, the youngest was 42. The average age is a little over 65. The average age of the remaining 32 cases was 55; of these, however, one died at 27 from phthisis, and others died at 33 and 35. Thirteen out of the 32 died over 60 years of age. The bodily condition varied; in nine there was emaciation, six were fairly or well nourished, and three were abnormally stout. There was no relation to age. Adopting the divisions in general use it is seen that the form of insanity differed, and that the length of time the mind had been affected also varied very considerably. Mania and melancholia appear to be about equally frequent. In Cases 2, 6, 10, 11, 12, 13, and 16 acute attacks of mania lasted up to the time of death. The rest had for some time previously been quiet, dull, and more or less infirm. The duration of insanity varied from 40 years to three months; only nine of the cases had showed symptoms less than five years.

In none of these cases were there any symptoms pointing to the existence of gall-stones during life; that is to say, they had never been jaundiced, no hepatic colic had occurred, and no pain had ever been referred to the region of the gall bladder. This is not peculiar to the insane. The great majority of calculi found in the gall bladder after death have been found by accident, and were not suspected during life. This is the case with those in patients dying at infirmaries. In none of Mr. Cooper's cases were there symptoms, and in one a stone completely closed the duodenal orifice of the common duct, without even giving rise to jaundice, a condition, however, which must be extremely rare. At a recent discussion at the Medical Society of London,* following Mr. Knowsley Thornton's paper "On Cholecystotomy," it was suggested by some that whenever gall-stones could be felt they should be removed by operation, but Mr. Marmaduke Shield remarked that "gall-stones often existed without causing any symptoms, and were very frequently found (post-mortem) where they were by no means suspected," a statement agreeing with Murchison and others. Mr. Hutchinson said that "the public should not be taught to look upon gall-stones as substances which, like urinary calculi, when found ought to be removed; they were constantly found with no symptoms whatever." Those that advocate the removal of gall-stones in all cases where discovered by palpation would find Colney Hatch the best of

* "Lancet," April 2nd 1892.

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schools at which to become proficient in the operation of cholecystotomy!

Attacks of excitement such as occur in recurrent mania might, one would have thought, dislodge the stones from the gall bladder, and by becoming fixed in the common duct give rise to symptoms or to colic during their passage to the duodenum. I have not found a stone in the common duct, and it is quite impossible to say if the passage of gall-stones took place in any of the cases. Cases have been recorded in which gall-stones have been passed per rectum, and in which there had been no previous history to point to their entrance into the intestine. In the case of the insane it is quite possible that, owing to the general dulling of sensation and of pain, such might more readily be overlooked than in others.

Now, as to the causes favouring the formation of gall-stones, authorities are fairly unanimous on some points. Wickham Legg, writing in Quain's "Dictionary of Medicine," says: "Want of physical exercise and indulgence in rich diet seem to favour their production." Taylor ("A Manual of the Practice of Medicine") says: "Sedentary occupations and over-indulgence in food seems to have some influence. The fatty and starchy constituents are thought to be more injurious." Austin Flint* says much the same. Bristow is more guarded: "There is reason to believe that they especially affect persons of sedentary habits. The influence of diet is unknown." Roberts ("The Theory and Practice of Medicine") writes:—"There are some important predisposing causes of gall-stones, namely, advanced age, the female sex, sedentary habits, habitual constipation, over-indulgence in animal food and in stimulants, and organic disease of the liver, gall bladder or bile ducts interfering with the escape of bile." According to Murchison† "gall-stones are particularly common in persons of stout habit, who consume large quantities of rich saccharine and greasy foods and alcoholic fluids, and who at the same time live sedentary lives." He adds: "From what has been stated it follows that gall stones are much more common in the middle and upper classes than among the labouring population and the poor." And in speaking of the treatment of jaundice from gall-stones he says: "It is necessary to counteract those habits on the part of the patient which

* "Principles and Practice of Medicine." Philadelphia, 1873.
† "Clinical Lectures on Diseases of the Liver," 1885.

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experience has shown to conduce to the formation of gall-stones. He must rise early, and take plenty of exercise in the open air, sleep in an airy bedroom, live sparely, drink little or no wine, and avoid all rich, fatty, and saccharine food and malt liquors."

Thudichum states that vegetable food predisposes more to gall-stone disease than does flesh food, and that mixed food affords the greatest predisposition to the disease. He says, however:—

"That persons of sedentary habits, such as authors or women following callings which entail little exercise of the body, are more liable to gall-stones than other persons of active habits has been alleged but not proved. So far as my own experience goes active habits, on the one hand, do give no protection from gall-stones if they are not joined with moderate habits of living; and sedentary habits, if not accompanied by excess in eating and drinking, do not by any means predispose to gall-stones. In the forty-five cases collected by Wolff sedentary habits could not be blamed for the disease, as most patients were of very active habits."

Thudichum is, moreover, opposed to the view that obesity predisposes to gall-stones, and thinks this view has exploded, it having held strong ground when cholesterin was believed to be a fat, thereby an explanation was founded that this substance was deposited in the biliary passages owing to the presence of an excess of fat in the body.

Amongst other predisposing causes that have been put forward at different times it may be mentioned that hard drinking water has been said to favour the production of gall-stones, but on very doubtful grounds. Our patients were for the most part derived from London and its neighbourhood, where a clay soil exists. It must be mentioned, however, that Colney Hatch Asylum is supplied with water from a well which passes down to the chalk, but some of the cases had been in the asylum a very short time. It has been said that renal calculi are often associated with gall-stones, and Murchison, who believed in their special frequency in persons who were the subject of lithæmia, quotes a number of observers, from Baglivi and Morgagni onwards, to show the co-existence of urinary and biliary calculi. I have only to say that in not one of my 50 cases was there a stone in the kidney or urinary bladder. Allied diseases, as gout and rheumatism, have been associated with gall-stones, as either occurring in the patient or in the family. Neither of my 18 cases had either of these affections. But Murchison includes

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in the same category the nervous affections of neuralgia, migraine, and urticaria.

Other diseases have been associated with gall-stones; for instance, they are said to be frequently discovered in the gall bladder of persons who have died of phthisis, and also of malignant disease. Concerning the latter, the figures which I have brought forward distinctly oppose this, but even if this were so, as Fagge* says, "This may be merely a coincidence, for both cancer and gall-stones are apt to occur in persons advanced in years." When primary malignant disease of the liver exists, and it almost invariably starts in the neighbourhood of the gall bladder, it is possible, of course, that the stones owe their origin secondarily from stagnation of the bile through pressure and obstruction from the growth on the ducts, but I am personally in favour of the view that the new growth results from irritation set up by the pre-existing stones, although the rarity of cancer of this organ, compared to the frequency with which stones occur, is somewhat against this view. There is no doubt that in cancer the body functions become deranged, and that this is the case in phthisis, a fact which may have some influence in favouring the concentration of the bile and, perhaps, alteration in its composition. So in marasmus of age; Samuel Cooper† is said to have drawn attention to the frequent occurrence of gall-stones in bed-ridden persons.

Some climatic influences have been alleged, and it is quite possible that they may occur with greater frequency in certain districts, but evidence is wanting on this point. It is amusing to note, however, that it has been said that gall-stones are most common in the winter. Seeing that old women, in whom they are most often found, die more frequently at this than any other period of the year, it is true, but as remarkable a statement as that of a well-known physician, who said that tinia tonsurans occurs with greater frequency in fair-haired children.

It has been said that imprisonment predisposes to gall-stones, on which point the following passage occurs in Thudichum:—

Soemmering states that he found gall-stones in the bodies of most females and males who died in the prisons of Mayence and

* "Principles and Practice of Medicine," edited by Pye Smith, Vol. ii., p. 504.

† Thudichum.

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Cassel. Bouisson also found them not rarely in the bodies of prisoners at Nismes and Montpellier, but not so often as had been stated by Soemmering. Besides these general statements, no data are in existence upon which to found any positive assertion, and, consequently, we are obliged to reject the hypothesis that imprisonment is favourable to the development of gall-stones.

And long-sleeping has been accused as a cause by Hoffmann, Van Swieten, and Haller.

In none of the text books in general use have I found insanity mentioned as a predisposing cause, but Mr. Jonathan Hutchinson* has lately remarked that gall-stones "were constantly found, for instance, in lunatics, especially melancholiacs, with no symptoms whatever."

Copland,† after mentioning sedentary occupations with rich and full living, names melancholic temperaments, with violent or depressing passions, under the causes favouring the formation of gall-stones. And recognizing the tendency to retardation of the secretions in the insane, he writes, when treating of insanity, "The state of the digestive organs, and especially of the biliary and the intestinal secretions, ought to be duly or even daily observed, and promoted whenever scanty or suppressed."

Dr. Goodhart,‡ in a recent article in "The British Medical Journal" on gall-stones, speaks of "stout people of sedentary occupation and high living" as the generally accepted condition of life believed to be present with cases of gall-stones, and then gives his own experience, which is in a contrary direction. He lays some stress on "the influence of mental worry in the production of gall-stones," concerning which he writes: "It seems likely enough that the lessening of the nervous flow, which must result from nerve exhaustion, may so retard the function of the abdominal viscera as in a true, albeit a vaguely-apprehended, manner to render the liver sluggish, and the various constituents of the bile would be then improperly formed, and some—as, for instance, the cholesterin—might become disproportionate in amount or thrown out of solution." He further adds: "I venture to suggest that errors of commission in diet have very little indeed to do with the production of gall-stones, and that their occurrence may be anticipated under any diet in a certain proportion of neurotics."

But "mental worry and anxiety" are the fashion of the

* Medical Society of London, *l.c.*
† "Dictionary of Practical Medicine," 1866.
‡ "British Medical Journal," Jan. 30, 1892.

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day; the number of diseases that owe their origin to this cause is yearly increasing at an alarming rate, and we shall probably soon have "all the ills that flesh is heir to" put down to mental worry. At the same time, I do think that the nervous system may exercise some influence on the production of gall-stones through a general lowering of vital activity. In old age vital functions are depressed and there is a sluggish flow of the secretions of the body, and this would, I believe, be increased by the pathological conditions that produce insanity, and thus considerably aid the formation of biliary concretions.

A large number of the conditions that have been mentioned are present in lunatic asylums. In the cases now brought forward we have advanced age in females, combined, for the most part, with a sedentary and depressed condition, and the general dulling of the system associated with insanity. It may be mentioned that gall-stones do not appear to be more frequent in cases of melancholia, as might have been expected, for that form of insanity existed in not more than half the number of cases, and in some there was acute mania throughout the whole course of the disease. Mr Hutchinson's statement is, therefore, not entirely carried out. Concerning the diet of the patients, it may be remarked that it is a liberal one, and is more of a carbohydrous nature than a nitrogenous, starch, sugar, and fats entering largely into its composition. From what has been quoted, it appears that most authorities consider an excess of fats and sugars one of the most powerful predisposing causes of gall-stones, but this is directly opposed by Roberts and is apparently not believed in by Goodhart. As already noticed, half the cases were markedly emaciated, and only three were abnormally stout. The patients are in bed from eight p.m. to six a.m., but this would not represent ten hours of sleep in some of the cases of acute mania.

I have at present only referred to the causes predisposing to gall-stones, and not to the actual formation of these bodies, but there is a point in connection with the latter that may bear an important relation to our subject. Most authorities give as one of the starting points for gall-stones, plugs of mucus in the gall bladder, and Fagge goes so far as to state that in all cases "the immediate origin of gall-stones is apparently a little mass of mucus; to this bilirubin is attached, and so a nucleus is formed upon which cholesterin is slowly deposited."

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I believe it to be an established fact that lunatics are particularly liable to catarrhal affections. We see this in sore throat, colds, bronchitis, and the frequency of pneumonia, which disease is one of the commonest causes of death in lunatic asylums. Remember, too, how severe the epidemic of influenza, a disease presenting catarrhal symptoms, has recently been in these institutions. Also attacks of diarrhœa are by no means uncommon. A catarrhal condition of the mucous membrane of the gall bladder probably exists with the same conditions elsewhere; there is then an increase of mucus secreted from that membrane. This being the case we have a further cause for our greater frequency of gall-stones in the insane. It may be mentioned that an actual inflammation of the gall bladder is mentioned by Austin Flint as a possible cause of gall-stones. The cause of the liability of lunatics to these catarrhal attacks is somewhat apart from the subject of this paper, but perhaps the exposure to draughts, to which these patients are liable, associated with the lowered bodily condition and perverted nerve action already referred to, may have much to do with their onset.

I have not brought forward gall-stones as a cause for insanity, nor shall I attempt to prove anything of the kind. I will merely observe that Murchison,* in speaking of the consequences of gall-stones when retained in the gall bladder, says, "It is very possible also that in persons of a nervous constitution they may be a centre of irritation from which may arise uneasy sensations and symptoms of actual disease in distant parts of the body, with great mental depression and hypochondriasis. Several cases which have been under my care have served to impress me strongly with this opinion."

My cases include only women, and the percentages of cases in which gall-stones occur holds good only for female lunatics. I have made inquiries from my colleagues as to the frequency with which they have found gall-stones in male patients, and am told that they are seldom found, probably not in one per cent. This agrees with Mr. Cooper's results at Highgate. Although the actual number may correspond with the accepted frequency in males, yet the proportion which this holds to that in females is not by any means so. As already has been said, all modern writers agree that gall-stones are of greater frequency in women

* *l.c.*, p. 543.

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than in men, but do not give the proportion. According to the authorities, however, quoted by Thudichum, the difference in the two sexes is not great, for he says:—

> Morgagni compared a great number of cases, and came to the conclusion that these concretions are almost as common amongst men as amongst women.
>
> It nevertheless became a current opinion that women were more subject to gall-stone disease than men. This belief was first decidedly expressed by Ch. Etienne ("De dissect. part. corp. hum." lib. III., cap. 42), and was adopted and defended by Fr. Hoffmann ("De bile corporis," Hallæ, 1704), by the celebrated Haller ("Elementa physiologica," Lausannæ, 1777), and Sœmmering. Of the 91 cases examined by Walter the majority, namely 47, belonged to the male sex, and only 44 were females. For practical conclusions these proportions may be considered equal.
>
> Out of 45 cases observed by Wolff (*l.c.*, p. 1) 15 were males and 30 females, giving a proportion of one to two.
>
> Out of 620 cases analysed by Hein, 243 were males and 377 females, making a proportion of about two to three.

The proportions just given are very different from those found existing after death by Mr. Cooper. They are apparently from living persons, and it is possible that the want of agreement is dependent upon the fact that in men, owing to their more active life, gall-stones when present are more liable to produce symptoms and so their recognition.

Hein is also quoted in Fagge's "Medicine" to the same effect. If this were true in our lunatics we ought to find gall-stones present in something like 24 per cent. of the bodies of males examined in proportion to the 36 per cent. found in the females. What is the cause of this great difference in the sexes? Fagge, writing on the greater frequency in women, says: "Perhaps this is due to the fact that females over the age of forty are particularly apt to gain flesh and to lead sedentary lives." Although the latter may be true of asylum and infirmary patients, yet the former is not generally so. In this connection it must be remembered that the male inmates of an asylum do not, as a rule, live to anything like the age of the female, owing greatly to the fact that general paralysis is far more frequent in men. The men, therefore, are not subject to the same conditions of life, such as diet, etc., for so long a time; and on the whole the men lead a much more active life, and, perhaps, are liable to become more restless and excited than the majority of the women.

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There is one more point on which I wish to touch. It is a remarkable fact that cholesterin, which enters so largely into the composition of gall-stones, is an important constituent of normal nervous tissue, where, according to Halliburton,* it is present in myelin or the white substance of the medullary sheath. From Baumstark's † analysis of the chemical composition of the brain we learn that in every 1,000 parts of the solids cholesterin occurs as follows :—

	In the white substance.	In the grey matter.
As free cholesterin ...	... 18·19 parts	6·3 parts
„ combined cholesterin	... 26·96 „	17·51 „

That is to say that cholesterin exists to the extent of rather more than 45 parts in the white substance and 23 parts in the grey to every 1,000 parts of the solid matter of the brain. There is evidently a serious mistake made by Allchin in Quain's "Dictionary of Medicine," where he says that cholesterin forms as much as "51·9 per cent. of the solids of the white matter and 18·6 per cent. of the solids of the grey matter of the brain." It is probable that here 1,000 parts is meant instead of 100 as written. It occurs also in far smaller quantities in the blood, and only to a slight extent in normal bile.

Cholesterin is generally regarded as a product of the metabolism of the nervous tissues, which should be eliminated by the liver in the bile, and, according to Flint, passes from the body in the form of stercorin. McKendrick ‡ says: "The mode of origin of cholesterin in the body has not been clearly made out; whether it is formed in the tissues generally, in the blood, or in the liver is not known, nor has it been determined conclusively that it is derived from albuminous or nervous matter. It is also doubtful if we can regard it as a waste substance of no use in the body, as its presence in the blood corpuscles, in nervous matter, in the egg, and in vegetable grains points to a possible function of a histogenetic or tissue-forming character." Cholesterin in the bile appears to be increased in amount in febrile and wasting conditions, a fact that may have some connection with diseases such as phthisis, and, perhaps, I may include insanity.

I do not know whether it has been shown that cholesterin

* "Chemical Physiology and Pathology," 1891, p. 531.
† "Lehrbuch der Physiologischen Chemie," Olef Hammarsten, 1891.
‡ "Physiology," i., 147.

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is increased or diminished in the brain of the insane. One might be inclined to think that in the brain it would be diminished in amount on account of the replacement of the nerve fibres by connective tissue with a compensatory increase in the biliary secretion owing to its elimination from the body. This would be an exceedingly interesting subject for investigation, and one which might throw some light on the subject which I have ventured to bring before you today.

NOTE.—Cholesterin is probably an ultimate product of certain tissue changes, which has to be got rid of, but whether it is solely manufactured in the nervous system is not clear. In the blood it has been proved to exist in the red corpuscles, and not, so far as I know, in the fluids of the blood. Seeing that the red discs are incapable of taking up and conveying a substance such as cholesterin from one part of the body to another, and as the difficult subject of the existence of this substance in the white corpuscles does not appear to have been worked out, it is impossible to say if any of the cholesterin in the bile is derived from the nervous tissues. It may be noted, however, that Drs. Noel Paton and Balfour consider that the cholesterin in the bile owes its origin entirely to the destruction of blood corpuscles, for in observations on the composition of human bile, they say, "In connection with the cholesterin and lecithin there can be little doubt that these are derived from the stroma of the red corpuscles. The vague view that they are derived from the nervous system, taught by certain physiologists, is based upon no better evidence than the fact that both substances occur in these tissues." ("British Medical Journal," May 7, 1892.) The former, writing again in the number for May 21st, says, "From the well-known fact that an enormous destruction of hæmocytes goes on in the liver there is at least a fair basis for the view that the cholesterin and lecithin of the bile are derived from these constituents in the corpuscles." Whether this view is correct or not, it raises an interesting question. In those persons in whom gall-stones occur, is there an excessive destruction of red corpuscles taking place in the liver by which not only the cholesterin, but also the pigment, is increased in amount?

Note upon Hæmatoma of the Dura Mater. By EDWIN GOODALL, M.D.Lond., B.S., M.R.C.P., Pathologist and Assistant Medical Officer, West Riding Asylum, Wakefield.

The following facts appear noteworthy as bearing upon the morbid condition going by the names "hæmatoma of the dura mater" and "pachymeningitis hæmorrhagica interna." In the course of recent experiments I have had occasion to incise the dura mater of (anæsthetized) rabbits and apply Sp. Vin. Gallic. or diluted cantharidin to the cerebral cortex through the aperture so made. On killing one of the animals after the lapse of 48 hours and opening the skull almost the whole of the right hemisphere (that

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