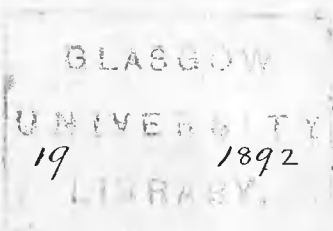


"Cardiac Disease in Relation to Mental Symptoms:
With Notes on the Hypnotic and Sedative Actions of
Paraldehyde and Sulphonal"

by
John Cockburn Syson M.B. Ch.B.



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"Cardiac Disease in Relation to
Mental Symptoms: With Notes on
the Hypnotic and Sedative Actions
of Sulphonal and Paraldehyde:"

Page I

The following remarks bearing on the question of heart: disease in its relation to mental symptoms were suggested by a case where I had ample opportunity for watching the progress of the disease, having attended the patient during a period extending over eight months. During this long illness I had often occasion to note how the mental emotions were affected by the visceral state, and how, in particular, cardiac

Page 11. (a) Cardiac abnormalities gave rise to psychological conditions of such a nature as one would look for only in a case where pathological changes were supposed to have taken place in the brain. The question of the connection between chronic cardiac disease and the abnormal mental sensations which so often accompany it, and which may be looked upon as constituting a kind of delirium, is one, I am aware shrouded in considerable difficulty and obscurity and probably better suited for the pen of a mental specialist, and the surprise is that upon a subject so fraught with interest there exists really very little literature. These abnormal sensations — this cardiac delirium — is a clinical phenomenon so often met with in cardiac cases, and in ~~the~~ some, its presence is so

So persistent that one is naturally somewhat disappointed ~~surprised~~ to find so little mention made of the subject in text books or elsewhere.

The notes on the use of Sulphonal and Paraldehyde are gleaned from results obtained with the drugs on a considerable number of patients though they have special reference to the cardio-vascular case therein recorded.

Going back as far as the time of Hippocrates we find that mental disease was looked upon as due to the circulation of black bile in the blood, and since his time though rapid strides have been made in the elucidation of many obscure medical and surgical problems our knowledge as to the physical causation of insanity is still deficient and imperfect. Most medical practitioners must have met in practice with cases exhibiting a close sympathetic connection between mind and body, and where there were symptoms, so to speak, of a bodily-mental nature. The subject of heart-lesions

lesions viewed in relation to mental disease is much too exhaustive to be fully gone into here, and I purpose merely to sketch the mental symptoms which were observed to follow in a case where the circulatory apparatus was known to be at fault. It has been denied by some that any marked change of repletion or depletion can take place in the cerebral circulation; that cerebral anaemia or hyperaemia can occur at all, or, if it does occur, that such a state of matters is responsible for the production of cerebral symptoms, and Dr. Mayo ("Lancet," April 16th 1887, p. 689) has tried to show how that the symptoms, so called, of cerebral congestion result neither from forced arterial action nor venous congestion. Other authorities, however, as Mosso, Mickle, and Duke oppose this theory, and maintain

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maintain that the condition of blood supply is responsible for symptoms, that, for example, the insomnia of incipient insanity is due to a hyperaemic state of the brain cortex. However that may be, or whether in the case to be recorded the symptoms observed were due to cerebral anaemia or other irregularity of the cerebral circulation I do not profess to know; but here is a case of a diseased heart, unable to perform its functions in an efficient manner where secondary mental symptoms afterwards develop. The question is can we connect the heart lesions with the mental symptoms? The chief factors of the brain circulation being the heart's action, ^{the} and vaso-motor apparatus of the brain, the molecular functional activity of the brain, and the atmospheric pressure, it is evident that

that cardiac disease may play an important part in regulating that blood supply and the cerebral functions. Whether the cardiac disease may give origin to mental disease and play the part of a chief factor of the psychical malady is the question to be decided. That it does so some are convinced, and of these Dr. Clarke ("On Insanity in Relation to Cardiac and Aortic Disease and Phthisis") writes as follows :- "Cardiac disease may, in the first place cause a disturbance in the balance of the general circulation in various ways: Secondly it may act by disordering the intra-cranial circulation: Thirdly it may cause mental symptoms by leading to a change in composition of the blood within the cranium: Fourthly by leading to a change of the blood generally: Fifthly it may so induce pulmonary disorder as to give rise to

to morbid impressions and sensations resulting therefrom: Sixthly it may so influence the nervous system as to become a source of peripheral irritation and influence cerebral functions reflexly." It is scarcely necessary to debate upon these propositions at any length. It is a well known fact and one often demonstrated that in mental cases with weakened circulation leading to imperfect filling of the cerebral vessels the brain functions vary and are influenced according as the patient assumes the erect or recumbent posture. Again we have the case of the student mentioned by Burrows who, because of a defective blood supply of the cerebral vessels could only study while in the recumbent posture. Then we have the action of digitalis in subduing maniacal excitement by quietening the circulation,

circulation, while vertigo may be mentioned as a condition brought about by disordered cerebral blood-supply. As regards the third of these propositions we can imagine venous stasis within the cranium leading to a poisoned state of the blood, and this being dammed backwards upon the capillaries acts as an irritant. In the same way the stasis may occur elsewhere as in the lungs, thereby predisposing to secondary pulmonary disease, and to those mental effects of morbid impressions which often follow thereupon. And lastly, when we think of the vast number of abnormal sensations often associated with cardiac disease, of the fears and despondency, of the oozing away of strength and courage, we can quite easily understand how such a condition may give rise to mental symptoms.

Symptoms. In cases of insanity where heart disease is the chief factor it has been noted that hypertrophy of the heart is accompanied by exalted conditions, while dilatation usually brings depression, and though this correspondence between the variety of heart disease and the form of insanity which follows can scarcely yet be said to be properly established it is surely strongly suggestive of a close connection between whatever special form the cardiac weakness may assume, and the mental disturbance which follows.

With these remarks I now proceed to the history of a case which came under observation, with its subsequent development and termination:-

History of Case:

A. B. a gentleman over 50 years of age occupied during most of his life a good social

Social position. Enquiring into the family history it is evident that cardiac and cerebral troubles predominate. His mother died of apoplexy, a brother of brain fever, while another brother died of heart disease. Exact cause of Father's death not known, though from narrative there was probably a cardiac element here also. Of the patient's personal history it is to be noted, that though during the last twenty years his life has been an easy one for about fifteen years prior to that he had to perform work of an arduous kind requiring much stooping, and an almost constant use of the arms. Notwithstanding this he is not aware of having at any time overstrained himself. He may be said to have enjoyed good health his only complaint being an occasional attack of asthmatic bronchitis. He never suffered from

from rheumatic fever, and there is no history or suspicion of specific disease. Though not a total abstainer patient was never given over to alcoholic excess, limiting himself chiefly to an evening glass of toddy.

Beginning of Present Illness:

About the beginning of December 1891 while transacting business in Glasgow patient was suddenly seized with an attack of vertigo, and, as he says, would probably have fallen to the ground had he not been supported by a friend and led to a seat. Some brandy and water were administered and after resting a little he felt well enough to leave the City and return home a distance of 20 miles.

Next day I was asked to see him, and the attack of the previous day was ascribed by his friends as due to some vague disorder of the liver. From a careful examination made

Page xj made at that date the following facts were noted:-

General Appearance: Patient is a man above the average height, (5ft. 10½") with a well nourished body and somewhat florid features. Head is large and well shaped and the expression is genial though at times a little apprehensive.

Special Organs: Hearing is a little defective on the right side. Sight good. Arcus Senilis just beginning to show, and the sclerotic coats of the eyeballs are dotted here and there with little patches of yellow fat. Senses of taste and smell normal.

Circulatory System: For over a year patient has complained more or less of palpitation, and on making inquiry it comes out that as a young man he was much annoyed by the same trouble. Recently he has also

Page 12.

also felt some cardiac pain, and when examined he was wearing a belladonna plaster over the cardiac region. This he thought helped to relieve the pain complained of. During the past six months patient had noticed, ~~that~~ on walking between his place of business and his house, some breathlessness and slight difficulty in coming up a short and moderate incline which formed part of the road. At certain times this difficulty was considerable so much so that he found it necessary to rest himself at intervals. To "avoid detection" as he put it, he used to have a look in at a shop window here and there, and by thus breaking the journey he was enabled to get over the ground better, and the cause of the breathlessness passed unheeded.

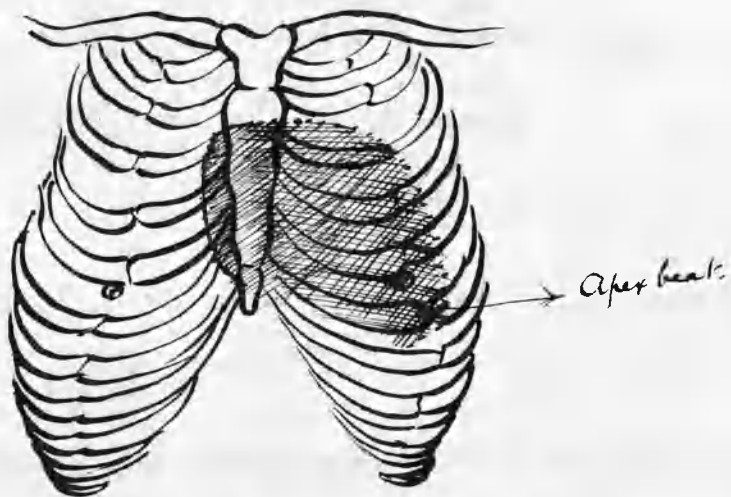
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Pulse: About 70 pulsations to the minute, and somewhat irregular. There was a tendency towards that condition of water hammer described by Corrigan, and at irregular intervals also a beat was missed. The radial artery was not tortuous but ^{very} slightly rigid.

Inspection of the precordial area showed the apex beat to be diffused, and displaced downwards and outwards the centre of greatest impact being about an inch and a half below, and one inch without the left nipple. There was also marked pulsation in the arteries of the neck and in the jugular fossa. The trachea was not displaced and there was no surface swelling. Palpation revealed a thrill over the aortic area. No epigastric pulsation. Percussion showed the heart to be enlarged

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enlarged - the left ventricle chiefly - the area of precordial dulness extending considerably to the left and as far down as the lower border of the 6th rib. The accompanying diagram indicates the area of cardiac dulness.



Auscultation:- Over the region of the aortic cartilage and conducted upwards into the arteries of the neck there was a distinct double murmur (the first being ventricular systole and the second ventricular diastole). The first part of the murmur was best marked and could be heard distinctly along the thoracic spine.

Spine. There was also at this time suspicion of a mitral regurgitant murmur, which later on became quite marked. There was no dropsy.

Respiratory System:

There was nothing at this time in the condition of the lung calling for special remark, but during his illness patient suffered from an occasional cough due to bronchial irritation. The exacting cause of these bronchial attacks becomes quite apparent when the case is further inquired into.

Digestive System:

Tongue slightly coated; appetite good; flatulency, and feeling of heaviness in the epigastric region after food. No vomiting. Abdomen: no pain, or tenderness; no ascites; bowels constipated; Liver normal in size; surface smooth. Splenic dulness normal. Complaint of occasional pain in the lumbar region. ^(Lumbago.) Urine normal in quantity; no sugar or albumen.

Nervous System: The patient was a man

man of business capacity and intelligence, with no mental peculiarities. He had always been of a genial and rather jocular disposition, somewhat emotional, and, of late, rather nervous and sleepless. There was no headache, and beyond the attack of vertigo mentioned (page 10) patient said he always felt his head to be all right. There was no spinal tenderness and no paralysis of muscles. Co: ordination was good and there was no rigidity or muscular spasm.

Treatment of Present Condition :-

Knowing the patient's apprehensive temperament a partial revelation only of the state of his heart was made to him. Rest, cardiac tonics, and pepsine, ^{after meals} were prescribed, and for the sleeplessness a warm bath at bed: time followed by a little toddy. During the next month the patient was only being seen every second day or so

Page 17.

So, and it became evident that mental symptoms of a melancholic type were beginning to develop. He was unusually (quiet) quiet and began to lose interest in his business. He became fretful, depressed, and restless, and could not fix his mind on any kind of occupation. At first he managed to get through his morning paper in a very hurried manner, but in six weeks from my first seeing him he could only manage to read a few sentences before he was forced to throw down the paper and take a short turn round the room. Soon the time came when he could not settle himself to read at all, and it was only after much coaxing that he could be constrained to listen for a few minutes to one of his friends reading. From being of a genial, jocular disposition he began to get most unsociable and

and moody. Even the access of intimate friends now annoyed him, until he refused altogether to see them, and the slightest attempt at mirth or pleasantry grated upon his feelings and irritated him in a remarkable degree.

Subsequently he began to harbour religious ideas of a gloomy kind. On the question of assurance he fretted himself very much. But the sleeplessness became now the chief and most disturbing factor in the case, and along with this there was a marked tendency to shift about from one bed: room to another. This he did under the impression that in a certain bed he could go to sleep, but no sooner had he gone there than he wanted back to the one he had just quitted, and thus he would move about from one bed: room to another often during a great part of the night. This symptom of

Page 19

of wandering about from one bed: room to another has been noted by Dr. Clifford Allbutt who speaks of it as a 'delusion of place,' and mentions it specially as occurring in cardio: mental cases. The mental anguish now became very distressing, and the patient refused to take an interest in anything save his own troubles. (Of these he spoke continually), and the hypochondriacal aspect of the case was evidenced by the soothing influence which sympathy with, and discussion of his troubles brought to him. He never ceased talking of his misery, and became fretful and irritated when any other topic of conversation was introduced. A man who had always taken stimulants in moderation it was now with

Page 20

with the greatest difficulty) that he could be induced to take either a little whiskey or Champagne, his scruples, as he told me, being the result of his religious ideas. For the sleeplessness, (the toddy and warm bath having lost their effect) various narcotics were tried in turn: hop-pellet, the bromides, chloral, chlorobrom etc. At first the results were fairly satisfactory, but subsequently the large doses necessary to produce anything like sleep were having a depressing action on the heart and these were given up.

It was now the middle of April - about 13 weeks after my first seeing him - and the patient had, during the last month, been losing flesh considerably. He was still eating well, though the restlessness was so great that he could not take time even to masticate his food, thus necessitating the use of spoon meat; Anaemia

Anaemia was becoming very marked, and this combined with the fact that the heart's action was becoming more irregular induced me to substitute digitalis and iron for the strophanth. he had formerly been taking. This acted very well for a few weeks. But as time went on the heart began to show signs of failure, and with

Heart
Failing

Mental Symptoms
Worse. the loss of compensation the mental symptoms became aggravated. The patient's condition was now one of marked melancholia. Even medical examination was borne with impatience. "Of what use is it, Dr.," he would say. "You have done all you can do, and it is all over with me now." For some weeks opium in its various forms had been the hypnotic used but this came to be tolerated to such an extent (5 or 6 grains during one night), and the anaemia was becoming so marked that.

Page 21

that paraldehyde was substituted. And here it
may be of interest to relate at some little length

Use of

on the results obtained from the use of this

Paraldehyde:

drug and of Sulphonal, which was used at
a later stage, and to compare the advantages of

the two. Of paraldehyde it may at once be
said that one objection to its use is its very

offensive and persistent odour and its disagreeable

Persistent
odour

taste. The odour could be detected in the patient's
breath for many hours after administration,

and the urine voided for some hours subsequently

Odour detected
in urine:

Smell of the drug, showing that part of it pro-

ably passed unchanged through the system.

At first 40 minims were given in peppermint
water, and this was soon followed by a

Effect of
small doses:

state of comparative restfulness though sleep
was not induced. Two hours later, the pulse

being unchanged 30 minims more of the drug

Page 23 drug were administered and within twenty minutes the patient dropped quietly to sleep which lasted more or less for 4 hours and was described as refreshing. Two nights later the same doses were again given, but this failing to produce the desired result 50 minims were given

Muscular
Twitchings

3 hours after the second dose. After this third quantity it was noticed that though the patient was evidently asleep there was considerable muscular twitching, and shifting about in the bed. These muscular twitchings went on for about 2 hours after which the patient was more restful but not asleep. The pulse was not in any way weakened but during the ensuing 24 hours there was marked muscular weakness and prostration. Two nights having elapsed paraldehyde was again administered this time beginning with 60 minims. In less than half an hour the patient

After
Effects:

Page 24 patient seemed on the borders of dreamland; but with the drowsiness there ^{were} ~~was~~ as before

60 minims
doses.

marked muscular twitchings and rambling talk. At the end of an hour another 60-minims were allowed, and this was followed by sleep which, though more or less disturbed, lasted for several hours. During the following day it was again remarked that the patient voided an excessive quantity of urine with the characteristic odour of paraldehyde. There was no diarrhoea or other gastro-intestinal disturbance. Allowing a night to elapse the drug was again resorted to on the succeeding evening; but though given in even larger doses than before the result was unsatisfactory and it was evident that tolerance had set in. I was forced therefore reluctantly to fall back upon morphia. In his "Contribution to the study of Paraldehyde." ("British Medical Journal," Mar. 9th 1889) Dr. Gordon affirms

Tolerance
Established.

Page 75.

affirms that the drug may be taken for months with equally good hypnotic results, but in my experience with paraldehyde in this and other cases I have not found it so. After very satisfactory results from the first few administrations the drug seems often suddenly to lose its effect, a drawback to its usefulness mentioned in the "Year Book of Treatment" for 1892 (p. 88). In this respect paraldehyde bears a marked contrast to sulphonal which may be administered over long periods with equally good results, and even in some instances in diminishing doses. In about 3 weeks from the last administration of paraldehyde, and while rest was being procured with large injections of morphia the heart's action began to fail markedly as evidenced by a large increase in the dropsical effusion of the lower extremities. Remembering the polyuria

Presence of
dropsy:

Page 26

Polyuria induced by the use of paraldehyde I determined to again have recourse to this drug and began by giving 90 minims at 10 P.M. Within half an hour the patient was asleep, though the pre-somnolent stage was marked by considerable excitement, and the sleep somewhat disturbed as on former occasions. At 12 P.M. he had become much quieter but was not asleep. The pulse being satisfactory and apparently unaffected by the hypnotic another dram was administered and more sleep was procured.

After muscular weakness:

During the following day the muscular weakness was very marked, the patient walking with difficulty and having to steady himself by catching on to objects in his room. But the most striking result was the disappearance within 12 hours of the dropsy of the lower extremities which had persisted during more than a week, and the

Disappearance of dropsy:

Polyuria.

accompanying presence of polyuria. On a

Page 27

a subsequent occasion as much as 120 minims of the drug were given in one dose followed in 2 hours by 90 minims, but the excitement and spasmodic muscular movements were so great as to make me think the cure worse than the disease, and so for the present the use of the drug was discontinued. After three weeks, however, with

Other Hypnotics

Used:

unsatisfactory results from urethane, chloralamide, etc, (not yet having learned to appreciate the value of sulphonal) and being unwilling to resume the use of morphia I determined to again give paraldehyde a chance using the drug this

Repeated

small doses:

time in small doses oft repeated. Beginning at 6 P.M. 30 minims were given and this was followed at 7 P.M., 8 P.M., and 9 P.M. by 20 minimi doses. After the second dose the patient was restless, lying quiet for half an hour but not asleep. After the third dose the excitement and restlessness

restlessness began to appear and after the fourth dose these were again so excessive that the patient's friends were unwilling to have the drug pushed further. At 10 P.M. the excitement and restlessness had nearly passed off, and during most of the night the patient was fairly quiet though there were only occasional and short intervals of sleep. This result was considered unsatisfactory and paraldehyde was not again used in this particular case. It is to be noted that at no time during the use of the drug was there diarrhoea, an after effect which has been mentioned as sometimes following large doses. (See Book of Treatment, p. 189, p. 88)

From its non-depressing effects upon the heart's action, and since it seems possibly to possess diuretic properties paraldehyde may become a useful hypnotic in cardiac cases with dropsy. Though the drug was abandoned in this case I have to much

No gastro-
intestinal
disturbance

Possible
diuretic
properties.

much faith in it. Here, the insomnia was most intractable and of all the hypnotics used, with the exceptions perhaps of Opium and sulphonal paraldehyde gave the most satisfactory results, and did not in any way interfere with the heart's action or with appetite and digestion. Over Sulphonal it has the advantage of having a much shorter pre-somnial stage, which, however, seems to be averted by excitement. It is also less of a heart depressant than sulphonal, and this, combined with the (at least) possibility of its having diuretic properties would make it a valuable adjunct to our list of medicines. But as a reliable hypnotic, and particularly in those cases where after-pedative effects are desired it is not, for a moment, to be compared to sulphonal, which was used in this case over a period of 4 months, and whose properties we will now consider.

Paraldehyde
versus
Sulphonal:

Sulphonal:

Consider. The idea of submitting the following notes on the use of Sulphonal as a hypnotic and sedative was suggested, not so much because anything new concerning the drug has been discovered as to emphasize its claims as a hypnotic which may be administered over long periods without losing its effect or even requiring an increase in dose. In fact beginning with a certain dose it has been found possible in some cases to diminish the quantity given without interfering with the beneficial results obtained, the drug seeming to have a cumulative action; in this way contrasting with the other hypnotics of its class. The experience of Dr. J. Carlyle Johnstone with sulphonal ('Journal of Mental Science' Jan^r 1892) will doubtless tend greatly to increase the popularity of a drug which was already proving itself to be a useful and safe hypnotic. That it is an ideal

Cumulative
Action.

Page 31

ideal one no person who has used it well venture, I think, to affirm; but when its advantages are pitted against its drawbacks, or a comparison between it and the other hypnotics made, sulphonal shows up well and the consensus of opinion coming from those who have tried it seems to be in favour of the drug when used in the proper way and at the proper time. The case in which I made most extensive use of sulphonal - the details of which have just been recorded - was not perhaps an ideal one for the exhibition of all the desirable properties of the drug, and yet the results obtained were so satisfactory as to place the other hypnotics used quite in a secondary place. When sulphonal was begun the patient had arrived at a stage in his disease when natural sleep may be said to have deserted him altogether. Bromides, chloral, Cannabis indica, morphia, paraldehyde etc had all been tried and even in large doses had come

Page 32.

come after a time to prove unsatisfactory). The patient was now in an extremely nervous, sensitive, irritable condition, and when to these is added the weakened and altogether unsatisfactory condition of the heart it is not wonderful that one should approach another and comparatively new remedy with something like distrust. The charge of heart depression brought by some writers against the drug tended also to make me somewhat apprehensive, and its use was therefore begun with caution and with the patient always under observation. Beginning with a dose of 10 grains this was soon found to be too small, although even this quantity produced a certain amount of quiet which the patient seldom enjoyed. Three hours having elapsed and the patient being still awake a second dose of 20 grains were administered and two hours later sleep followed. Of the sleep produced by Sulphonal

Charged
with Heart-
Depression:

10 grains

Dose:

20 grains

Dose:

Page 33.

Nature of

Sleep pro:

: duced:

Sulphonal it may with safety be affirmed that it is sound. In this case the patient seemed to rest tranquilly, although his slumbers were never profound. Sleep was easily disturbed by noise or movements in the room, but when his nervous apprehensive condition is recalled to mind this is not surprising. It was never in this case accompanied by disturbing dreams. The awakening was free from unpleasant sensations, and the patient usually expressed himself as feeling refreshed and thankful for the rest and after quiet. There was, however, always more or less after drowsiness, and on some occasions when large doses of the drug were given (40 grains) this was pretty marked, and lasted during the course of the succeeding day. The patient then seemed drowsier for exertion and preferred, instead of getting up as was his custom, to lie in bed where he usually

Post: somnial

drowsiness:

usually slumbered lightly at intervals over a period of several hours

Effect on the Muscular System: When he could be induced to leave his bed the patient complained of unsteadiness of gait, and want of co-ordination, and this was occasionally accompanied by a little confusion and dulling of the intelligence.

Effect on the Circulatory System: In this case sulphonal had a decided effect on the pulse. After a dose of 30 grains this was very markedly slowed (20 beats per minute) and softened, and when this dose had been repeated three times at intervals of 24 hours there was decided intermission and irregularity. These effects were frequently observed, and owing to this fact the use of the drug was not kept up continuously over periods longer than a week, after which two or three days were allowed to elapse before another dose was administered. During these periods of abstinence

abstinence the pulse immediately regained its normal strength and rhythm. In other cases where the drug has been used beyond a slight softening and slowing of the pulse such as would accompany natural sleep nothing has been noted.

Digestion: Except that while the patient was in a state of drowsiness when the desire for food was not naturally marked sulphonal does not seem to have any prejudicial influence on the digestive system, and has not been known to cause irritation of the gastro-intestinal tract.

The Skin: After a dose of 40 grains the patient at first complained of "cold sweats" and an uncomfortable feeling of cold down the back. So marked was this on several occasions that during the night the back and body generally had to be dried with a warm cloth, and the underclothing changed. Subsequently, however, this uncomfortable after effect became less marked, and how far the

Effect on
Digestive
System

Effect on
the Skin

the sweating at first may have been the result of fear and excitement I am not prepared to state. It is worthy of notice moreover that neither Dr. Johnstone nor Dr. Gordon ("British Medical Journal" 29.3.90) has ascribed to sulphonal any special action on the skin, while Mr. Raymond ("British Medical Journal" vol. 13th 1889) as the result of experiments conducted at the St. Antoine Hospital, Paris puts it on record that the secretion of the sweat glands is actually diminished.

With regard to Respiration, Temperature, and the kidneys the action of sulphonal may be said to be slight or negative.

Effects of doses repeated at intervals of 4 or 8 hours:

So far we have been considering the effects of sulphonal given in a single dose or of several doses repeated at lengthened and irregular intervals. It will now prove interesting, doubtless, to mention briefly the effect produced by administering the drug at regular intervals and continuing its use over a lengthened

Couch where at intervals he enjoyed intermittent 'naps', lasting for half an hour or so. Along with this drowsiness a sort of dreamy confusion became noticeable, with an inclination to be allowed to lie about and not be disturbed. This became more pronounced as the drug was continued and passed into distinct weariness and fatigue followed by unsteadiness of gait and staggering with in:

Post-somnial

fatigue with

ataxia.

movements:

feebleness and uncertain movements particularly in the lower extremities. The patient's articulation in this state was somewhat thick, but though he required to be roused from the state of stupor in which he was he could converse with clearness. He occasionally complained of giddiness when trying to assume the erect posture, but the motor fatigue and muscular incoordination were the most marked after effects.

Analgesic Properties: Besides being a hypnotic and sedative my experiences of sulphonal have been that it is also a valuable analgesic. I have given

Given it after fractures, after amputations, for the after pains of labour, for migraine, and in fact in numerous cases where pain was a prominent symptom, and the results have invariably been satisfactory. The first effect of the drug is a gradual cessation of pain, and after a period of variable length sleep comes on.

Advantages

of
Sulphonal.

To sum up then we are justified, I think, from the evidence in its favour to class sulphonal in the list of efficient hypnotics. Given in properly regulated doses there is no doubt it produces sleep, and that of a calm, refreshing kind. Its after soothing effect is also a valuable property particular in such a case as has just been recorded where the restlessness and misery were so pronounced. The objections to the drug are

Objections

to
Sulphonal.

its slowness of action and the after drunken-like symptoms which, when given in large doses it undoubtedly gives rise to. Sulphonal may be

Page 40
base of
Salphonal
Poisoning. be given in large doses (40 - 50 grains) where necessary with safety, though a fatal case has been recorded ('British Medical Journal' 25th Oct. 1890) where a gentleman was supposed to have taken over an ounce of the drug in one dose. But it is very questionable whether in ordinary cases doses above 30 grains are desirable, My experience has been that moderate doses give quite as satisfactory results so far as the hypnotic effects are concerned and do not so readily give rise to the unpleasant afterconsequences mentioned.

Advantage
of moderate

Doses:

Another advantage claimed for Salphonal (and here it has the advantage over Paraldehyde) is its tastelessness. In nervous cases where the patient often objects or refuses to take medicine it can thus be administered by stealth, in hot coffee, spirits, milk, gruel or on buttered bread. It is best put into some hot fluid which is afterwards allowed to cool.

Another
advantage:

Page 41. Cool. Altogether it may be said that if sulphonal is not a perfect hypnotic - and which hypnotic is perfect? - it is at least a valuable one, and will probably continue to hold its ground amongst the older sleep producers.

Cardio: Termination: clearly four months had gone
Mental since the use of sulphonal was begun, and
Case could during that time the patient was gradually losing strength and muscle flesh. The dropsy never returned. On one or two occasions ~~to~~ there were "weak turns" which, (though not present at the time) I ascribed (from the description given me) as being due to cardiac dyspnoea.

Cardiac
Dyspnoea:

One of these attacks subsequently carried him off just eight months after the heart disease was first discovered. That it had been in existence prior to this there can be

Page 42 be little doubt.

Conclusion: Such is a crude and disjointed description of facts; and the question now is can we connect the heart lesions with the mental symptoms which subsequently made their appearance? There was a man insidiously undergoing an entire change of disposition. From a man of genial and unselfish temperament he became, despite all the attentions of doctors and friends, everything that was the reverse; got more and more estranged until his life became a burden, and his mind the home of all that was miserable. We know how acutely sensitive are the nervous centres and their peripheral arrangements of any departure from the normal. Such a

a condition of things as that resulting from aortic and mitral regurgitation with hypertrophy and dilatation may lead to material interference with, or perversion of, the mental functions. The proper fulfilment of the normal functions of the brain, and indeed of all the bodily organs requires an adequate supply of nourishment which in such a case as the foregoing can scarcely have been forthcoming. With disabling heart-disease came a general disturbance of the balance of the circulation, and impeded return of blood to the right side of the heart, including impeded return of blood from the cranial cavity, and all the more so as here came into play the closed nature of the skull. Stagnation in the venous sinuses would tend to follow, and this acting backwards upon the large arteries

Page 444 Arteries would give rise to irregular circulation, local retention, poisoning of the parts with retained effete products of tissue metabolism, and changes of blood pressure not only upon the vessel walls, but also upon the substance of the brain. Should there in addition be histological changes in the walls of the bloodvessels their partial occlusion and diminished elasticity will leave the brain substance in a partially starved condition. And thus the weakened and irregular heart may lead to arterial starvation and venous congestion, and, apart altogether from diseased or healthy cerebral vessels, give rise to abnormal mental symptoms. So long as the heart was doing its work properly, so long as the hypertrophy was compensatory, all went well, but as soon

Pages 5 Soon as the compensatory nature of the hypertrophy failed so soon was there interference with, and deviation from the normal functions of distant organs, especially of the brain. With this compensatory failure came dilatation of the left ventricle producing insufficiency of the mitral valve. And here began the mental troubles. When the heart failed to send to the brain a regular, sufficient and well oxygenated supply of blood that important organ refused to be satisfied and showed signs of weakness in the form of mental depression and misery. The 'delusion of place' already mentioned was, in this case a well marked feature. The patient imagined himself elsewhere than in his own bed-room; wanted to be up and dressed in order

Page 46 order to leave, but even then he was not at rest: When reasoned with, or restrained he became fretful and angry, and his persistency in proclaiming his delusions and trying to act upon them entailed much anxiety and difficulty upon his friends. These troublesome intervals, however, did not usually last long, and there were times when the patient was quite sensible and easily managed. Again and again I had occasion to note the change in the mental condition which seemed to be affected by the state of the pulse and the behaviour of the circulatory apparatus generally. When the pulse was markedly irregular, or quickened the excitement and ⁱⁿ happiness always seemed worse, and when the heart's action had been slowed and steadied by large and repeated

Page #7. repeated doses of heart tonics, or from whatever cause, the mental condition invariably improved. So marked was this that there were times when the patient seemed his old self. For a time he would throw off his melancholy, and, apparently forgetting his troubles, would even surprise his friends by chatting in his old familiar, jocular way. It was at these times that I used to feel sceptical about the existence of cerebral disease at all, and tried to believe that could the cardiac condition be cured the mental symptoms would soon also disappear. Whether in this case cerebral disease actually supervened, and if so, whether it followed as a consequence of the heart disease are problems which cannot be solved with certainty. Unfortunately, anxious as I was to secure it, no post-mortem

Post: mortem examination was allowed, and so, although there can be little doubt as to the state of the heart, it would be mere conjecture to speak of the state of the brain. In a case recorded by Dr. Macdonald, Dorset County Asylum, where mental symptoms of a melancholic kind constituted the disease for which the patient was confined it turned out at the post: mortem examination that no pathological changes - naked eye or microscopic - had taken place in the brain, and the only lesion discoverable after death was an enormously enlarged heart; (chiefly left ventricle) which, during life had given rise to a well marked mitral regurgitant murmur, and also, as Dr. Macdonald maintains, to the mental symptoms mentioned. May not this have been a case of a similar kind?

Page 49 kind? That there was here a connection of some kind between the cardiac and mental states I am bound, from all that was seen, to believe; but what that connection was, or how far, if at all, the abnormal cardiac condition may have given rise to pathological cerebral changes is a question the solution of which I leave to those who have more opportunity and ability for tackling such a difficult problem. Without wishing to dogmatize or suggest anything in the way of treatment I may be excused, in view of the probability of some connection existing, in merely hinting at a lesson to be learnt. It is this. With mental perversion we may not always perhaps have gross brain lesions, and before the case is written down as purely cerebral it would be well first to make

Page 50 make a careful examination of all the bodily organs - particularly of the heart - and see whether the mental symptoms may not in some way be connected with disease elsewhere. When we have satisfied ourselves that no disease exists, or that disease in other organs cannot be connected with the mental symptoms, then, but not till then, are we justified in attributing those symptoms to pathological brain changes.

J. Jackson Dyson