950. How many representatives have the company?—Eight.

951. How many representatives have the employees?—Twenty-six.

952. That is to say that the men have the majority of the representation on the council?—Yes.

953. For what general purposes does the council exist?—It governs all the co-operative activities carried on in connection with the works.

954. Such as?—The co-operative store and any matters of interest to the men that are ventilated at the meetings of the council.

955. Has it any connection with the accident fund?—No.

955A. Does it not in general interest itself in all matters of community interest to the employees and their welfare?—Yes; all matters of common interest to the employees and their welfare are dealt with by the council.

956. Are you a member of this council?—Yes.

957. How long have you been a member of it?—Since June, 1924.

958. Has the council recently been discussing the advisability of establishing a dental clinic?—Yes; the matter was under discussion before I joined the council, and it has been gradually developed all through the past year. Many difficulties presented themselves in outlining a detailed scheme that would work, and the council sent delegates from the Co-operative Council to the electrolytic zinc works at Risdon to investigate any welfare arrangements or co-operative activities over there, and to report back to our Co-operative Council.

959. Would you regard the dental clinic as inspected at Risdon as a community benefit to come under the Co-operative Council's activities?—Yes.

960. What was the result of the investigations of the delegates?—As the result of the investigation the council unanimously decided to approach the Associated Smelters Company with a proposal for the establishment of a clinic at the works.

961. What was the result of the representations made to the company?—An arrangement was reached as to a scheme, and that was set out in a circular, which I put in (Exhibit 8), that sets out the whole thing.

962. By whom was the circular issued?—By the Co-operative Council.

963. It is signed by whom?—By the chairman, vice-chairman, and secretary of the council.

964. The chairman is Mr. R. A. Burgoyne; who is he?—He is the accountant at the works, and was elected chairman by the council.

965. Who is Mr. J. L. Polmear, the vice-chairman?—He is an ironworker at the works.

966. Mr. Jude is the secretary?—Yes.

967. This circular tells all concerned of the suggested arrangement made between the company and the Co-operative Council, subject to confirmation?—Yes; subject to confirmation by 50 per cent. of the employees.

968. I have before me an advertisement, signed by Messrs. Polmear and Jude, which appeared in Saturday's issue of the *Recorder*, Port Pirie, advising that the vote is to be taken. What is the substance of the advertisement otherwise?—The substance of the advertisement is to bring the matter under the notice of all employees, and to advise them not to miss this chance of having a dental clinic. It asks them to vote solidly for the appointment of the clinic, and advises them that it is not an experiment, but that a similar institution had been an unqualified success in other centres of industry, notably at the electrolytic zinc works, Tasmania. (Advertisement put in and marked Exhibit 9).

969. In your evidence you gave it as your opinion that there was room for more complete co-operation between the company and the men in regard to matters of health. Do you anticipate the whole-hearted co-operation of the employees in this proposal?—From the unanimous attitude of the council towards a proposal it considered so important and attractive, we, as a council, were hopeful that the whole body of employees would support the scheme cordially. We were surprised and disappointed to notice an advertisement appearing in Saturday's issue of *The Recorder*, as follows:—

A.W.U.

Members are hereby notified that participation in any ballot at the works is contrary to a resolution carried some years ago, and re-affirmed at last Tuesday's meeting.

Members are requested to loyally adhere to this decision, and refuse to accept ballot-papers on the dental clinic.

W. ROBINETTE, Organiser.

(Advertisement put in and marked Exhibit 11).

970. You say you were disappointed at this turn of events. Please explain a little more fully?—From my own personal experience I know how important it is to keep my teeth and mouth in good order. From my experience as a company commander in the A.I.F. during the war I know that the Dental Corps performed great service in preserving the general health of the troops through keeping their teeth in order. This fact was recognised to such an extent that a dental organisation was built up in every brigade. In every training camp throughout the army, both in Australia and abroad, there was a dental organisation working in touch with the medical service. No man was drafted as fit to be sent abroad on active service without first having been examined, and, if necessary, attended to by a dentist. In all works on general hygiene in connection with industries mention is made of the importance of the teeth. Our council fully realised that this matter of the teeth was important, and that was why we wished to put into operation a scheme which would give the men dental attention at the lowest cost. The council felt it would be a benefit to the men in increasing their general standard of health. Knowing these things the council are disappointed that this advertisement has appeared, because if the men follow that advertisement it will be a very important factor in the vote recorded.

971. Was it not a fact that the rejections among the men who volunteered for the first and second divisions of the A.I.F. were to a considerable extent due to teeth?—Yes.

972. In the early stages of the career of the A.I.F. the necessity for a dental unit was not recognised, was it?—At first it was not recognised, but it was later. Although I am quoting no authority for my opinions, it is commonsense on one's part to realise that anyone who was with the A.I.F. knows these things as a matter of general knowledge.

973. *By Mr. Robinette*—What matters do the Co-operative Council deal with, other than the management of the store?—A matter which comes before them from time to time is the question of regulating collections at the smelter gates. At most meetings of the council matters are brought up drawing the company's attention to different conditions about the plant.

974. Working conditions?—Yes.

975. Anything else?—From memory I cannot specify anything now. For the past year the dental clinic has occupied considerable time and discussion. Further, the proposed bakery and other institutions in a co-operative regard have been mentioned.

976. Do the employees get a detailed report of the activities of the Co-operative Council from the representatives of the various departments?—Do you mean a written report?

977. How do the representatives report to the general body of workers?—I should say by personal contact.

978. Is it permitted on the works for representatives to interview the men and give details of the activities of the Co-operative Council?—There is always a certain amount of conversation going on among the men. That is so among every body of men.

979. Do you think it possible for 26 representatives to give detailed reports to all the employees at the works?—I think they would come in contact with the majority of the men from day to day. I speak to a good many men in a day myself and I think you do, too. It does not take a man long to meet 100 men, and that is above the average number of employees per council representative. On matters of extreme importance, such as this clinic, there is practically a report of what is being done published in the exhibit which I have put in.

980. Are you aware that one of the first symptoms of lead poisoning shows in the teeth?—I understand that lead absorption may show in the teeth.

981. You say that if a doctor were appointed he would co-operate with the dentist?—I did not know I did so.

982. You heard Mr. Somerset say that?—From memory I cannot say I did.

983. He did say it. Do you agree with that?—I should say he would.

984. You agree that the doctor, if appointed, would co-operate with the dentist?—Yes.

985. You know that when a tooth is drawn there is a loss of blood?—Unless the tooth is very rotten.

986. Invariably?—Not a serious loss of blood. I have had some teeth pulled out with no more stain of blood that I could spit out. I think it is exceptional if there is a great loss of blood.

987. There would be sufficient loss of blood to take a blood test in respect to lead poisoning?—I am not qualified to speak on that. I have never taken a blood test.

988. Do you know how a blood test is taken?—I have seen it taken. I am not qualified to say where a test would be taken. I do not think it is a fair question to put to me.

989. It would be possible for a doctor to take a blood test if there?—I do not know. I think it is a matter for the doctor.

990. If this proposal is agreed to by 50 per cent. of the employees, it will make it compulsory on new employees to join that dental clinic?—It will make it compulsory on any one who signs, I think. I am not quite clear from memory as to new employees. I would like to refer to the circular. (Witness referred to the circular). I do not see it in the circular.

991. Has the aspect of making it compulsory for new employees been discussed before the Co-operative Council?—Not to my knowledge.

992. Have you been present at all meetings of the council?—Not all.

993. Would it be possible for it to have been discussed and you not be aware of it?—I think I would have been told of it, or got to know of it, had it been discussed.

994. You heard the secretary's evidence, in which he said it would be compulsory for new employees?—I did not hear that. He may have said it.

995. You stated in your evidence that you worked in New Zealand in 1909. In what portion of that year?—From about some time in January to about half-way through the year.

996. Did you work in the smelters at all during the lock-out?—I do not know of a lockout.

997. Or strike?—No.

998. You were never in those smelters working during the strike?—No.

999. Are you aware that you are regarded as a loyalist by the men on the smelters?—Would you define a loyalist?

1000. Yes; one who is loyal to the master during a strike, and not to the men?—I do not know whether I am so regarded or not. I have at home a list of those who were so regarded, but my name is not on it. Still, the list may not be complete.

1001. You received a roll of honor and your name is not on it?—That is so. A roll of honor was published, but I do not regard it as being complete.

1002. You say that you try to instruct the men regarding precautions. Do they disregard your instructions?—Some do, and some accept them.

1003. Can you advance any reason why they disregard your instructions?—No definite reason, except that perhaps they do not realise the necessity for them.

1004. Is it because they do not think you are competent to give instructions?—They have never told me so. It may be that.

1005. Do the foreigners do the more menial work down there, and do you think the hazard would be greater if they did?—No; I think the foreigners are pretty well distributed over the works.

1006. How do you know that the company does not encourage foreigners to come to Port Pirie?—The company issued a circular all around the works to those responsible for the control of the different departments, giving instructions that British were to receive preference, so the two conditions would not harmonise.

1007. Would that prove they did not encourage them?—It would be obviously foolish to encourage them to come to the works and then to issue a circular not to employ them.

1008. Still, they like to have a lot of men on the gate?—I do not know that they do.

1009. The installation of the granulating process was not solely to reduce the health hazard?—Decidedly not. It is a It is a mark of progress in the development of the industry, and all progress goes hand in hand with the improvements of conditions generally. That is recognised.

1010. It was installed to reduce the cost of disposing of the slag?—It has accomplished that.

1011. You stated that you consider alcohol was a predisposing factor to plumbism?—I have read so.

1012. Do you believe it?—In excess of a reasonable amount, certainly, as I admit in my evidence.

1013. Are you of the opinion that alcohol plays a big part here in lead poisoning cases, and the incidence of lead?—I am not prepared to say what part it plays.

1014. Do you think the holiday bonus is an incentive to a man to overtax his endurance?—No.

1015. The new bullion-handling plant is installed to reduce cost, and not purely with the object of reducing the health hazard?—It is installed to reduce the cost, but will reduce the health hazard.

1016. But it was installed principally to reduce the cost?—I am not prepared to answer that question. I don't think it cuts any ice at all. It will reduce the health hazard. It is another sign of progress.

1017. *By Mr. Pearson*—From your duties, you have a detailed knowledge of the various sections of the company's works at Port Pirie?—Yes.

1018. Have you noticed the dust that collects on the framework of the various buildings and under the conveyors?—Yes.

1019. Is there any arrangement for cleaning down the buildings?—Hosing and sweeping are the only arrangements we have.

1020. Hosing and sweeping are confined more at present to the floors?—Yes.

1021. You would not say that at the present stage much attention has been given to the walls of the building?—Not a great deal.

1022. Have you inspected recently the slag hoist boilers?—I was in there two or three days ago. I have often been in.

1023. Did you notice the accumulation of dust on the framework of the building?—I daresay there is dust there.

1024. In regard to that building, an employee stated in evidence last week that the conditions there have become much more dusty latterly. Do you consider that to be a dusty situation?—That place, I daresay, may get dust. There is traffic there, but the place is pretty regularly watered down.

1025. You mean outside of the place?—Yes. I have had hydrants put commanding that place. There is one on the corner of it.

1026. We have had from Mr. Somerset a complete description of the metallurgical processes. Could you give us any information, taking the plant in the same order, as to the working conditions for the men employed with a view to health hazards, commencing with the unloading gang?—Those conditions in any part of the works vary from time to time. Mr. Somerset indicated that very clearly this morning. Some time ago we arranged with the Broken Hill South Silver-Lead Mining Co. to supply us with apparatus for the purpose of determining that position over a period of time. These investigations are now going on. They will probably be the best answer to the question. I would not like to state definitely which place is or is not bad until these results come out.

1027. You refer to a dust survey of the work?—Yes.

1028. A dust survey conducted with such repetitions as to include practically every condition of wind and of weather?—Yes. That has been found necessary in other places, and we

are following that practice. Two of the instruments have been obtained from Broken Hill, and I think we are arranging for a third.

1029. As to bin attendants, what are the arrangements for keeping down dust and cleaning up the dust that falls?—Following the ore in metallurgical sequence, the ore comes into the works in trucks, and all our dumps are provided with a water service. I will not say all, because they are being extended from time to time. We are going to make them more complete in the railway yard, for instance. At present when slimes are being loaded they have been found difficult to moisten, because when a hose is played on them the surface material becomes mud, while the underneath portion may be unaffected. Our present system is to make what practically amounts to garden beds on top of the dump. The dump is levelled and made into beds, the sides of which are combed up, and the beds are allowed to soak, so that the water has time to sonk through. This greatly improves the situation, and eliminates dust from it. On the concentrate dumps there is water available, and on the siliceous dumps also. When siliceous ore is being taken direct to the top floor of the smelters the trucks are watered before it is unloaded, and at the point where it is unloaded there are a tap and hose, and a notice reading somewhat like this: "This material must be wetted." Some of the fine bag slime we receive is spread out on the ground in beds, and watered similarly to the slime we receive from Broken Hill. With the ore that is crushed at the crusher, the hood over the crusher bins draws the dust away as the ore is taken from the bags into that bin, and the water service in the bin moistens it, as does also the water service on the belt.

1030. That hood is connected also with an exhaust fan?—Yes, with a small baghouse to collect the dust. That covers the unloading of the ore. On the Dwight & Lloyd unloading belt a water service has been installed, so that any dry trucks of ore from Broken Hill may be wetted down there before being unloaded by the contractors. A pipe runs the full length of the belt, with hoses every few feet. The attendant on top of the storage bin has a watering can with which he waters down the floor. It is difficult to know where to put taps, because they are so liable to be left running, and a tap on top of a building left running becomes a serious nuisance. Therefore a can is used to sprinkle the floor before the man sweeps. All round the Dwight & Lloyd plant there are hydrants for watering the ground, and watering cans are used for watering the floors of the plant as required. The charge as it issues from the mixing bin is moistened on the belt, so that the material from that bin becomes moist. In regard to the taking of the chamber material, sprays have been put into the vacuum chamber, and the material can be taken from that quite moist now. The position there has very much improved. The same applies to the cyclones. They have been fitted with water seals, so that the cyclone dust can be run out as slime or sludge. The tips off the A section machines were always provided with hoods, but these hoods have been very much improved during the last two years by being extended so as to be higher than the top of the machine floor and the intake—the bottom part level with the machine floor—has been extended to cover the sprays over the palettes, so that all the steam, fume, and dust that rise when the palette tips are now carried right out clear of the building. That has been a great improvement. When they started to put them in the men on that floor spoke very highly of the improvement. The bottom of these A machine discharge chutes or hoppers was made a very much tighter fit on the tray conveyor, so that the amount of fume that was belched forth as a palette dropped has been greatly reduced.

1031. The fume that escapes from that tray would, under certain conditions, go back on to everybody employed in the process?—It used to to a greater extent than now. There is a little of it now, but it is greatly improved. That is evident to anyone who has watched the process. A worm screw discharge has been tried, and these are being installed on the remaining machines. They will enable the material to be more thoroughly moistened, and the discharge will be even, so that it will be possible to eliminate the tray conveyor and substitute a conveyor belt. This will mean that the heavy maintenance at present necessary to such a device as a tray conveyor will be greatly reduced. That will act in two ways. It will be an improvement mechanically and economically, and also reduce greatly the number of men who will have to work round there.

1032. In your former evidence, in reply to question 484, you described improvements made to the Dwight & Lloyd plant. Were they made to benefit a particular section of employees only, or all the employees?—What was done with regard to the cyclones and the machine chambers will benefit those men who work on those parts. A gang of several men will be affected. If we are able to do away with the tray conveyor, that will benefit a number of men—ironworkers, &c.—who do repair work.

1033. They are the men classed as service men in Mr. Somerset's statements?—Yes.

1034. In regard to the cleaning of the buildings, has any consideration been given to the adoption of any method of cleaning them periodically, such as with motor vacuum apparatus?—A considerable sum of money has been spent experimentally with a vacuum cleaner. Experiments are still going on. The cleaner was tried running at a high speed to give suction of about 8in. manometer pressure, and indications are that it will be a success. I would not like to say definitely it will be, but should it be a success it will probably be adopted.

1035. Would that be useful in cleaning up the dust around the buildings, and the buildings generally?—Possibly it would. There is another view, namely, that if the buildings were once cleaned down, the use of a light spray might wet the material sufficiently to allow it to be cleaned without the vacuum cleaner. That is a matter that is now receiving attention.

1036. The dust in many of the buildings is the result of many years' accumulation?—Possibly it is.

1037. You think it may be practicable to evolve a method, by means of the use of a motor vacuum cleaner, that would be useful?—Yes. It is a question I have seen referred to in literature. I cannot quote the authority, but the point was whether the frequent disturbing of the dust caused any gain, because the risk of disturbing it might be even more serious than leaving it as it was.

1038. Might not that refer to enclosed buildings? In open buildings like yours, where ventilation is good, and in a climate like ours, the dust is bound to be circulated with certain winds. Is it not true that the more dust there is collected the more there will be to blow about?—It would if the buildings were being disturbed much, but some of our buildings are not disturbed much. It is difficult to give an answer that will apply to every case. I have looked at various places in the works, and it is a question whether you would not raise more dust by disturbing things than by leaving the dust where it was. I have seen the same thing mentioned in works I have read for information on the subject. I am placing a report on some of these questions before the company at present, and I quite realise the difficulty of the matter. The question Mr. Pearson has raised is not new, and it puzzles me as much as it puzzles anybody else. It is a many sided question. If the Commission can come to any decision on the matter and give us any advice we shall be glad of it.

1039. You have referred to the unloading arrangements, the railway yard, and the Dwight & Lloyd plant. With regard to the dust at the Huntington-Heberlein plant, Mr. Somerset described what was being done to reduce the fume by giving the charges greater time to cool before tipping. Is there any special point in connection with the reduction of dust there on which you could give the Commission information?—I think the cooling in the pots is the best solution of it. If the material is tipped hot it cannot be moistened adequately. If it is tipped as cool and as moist as possible, that is all that can be done.

1040. *By Mr. Gepp*—Being allowed to cool right off the material should be moist when tipped?—Before thorough moistening came into vogue the material was hot and, of course,

very dusty. By giving it more time to cool it is more moist, and does not give off fume or dust to such an extent as before.

1041. *By Mr. Pearson*—Can you tell us anything about the dust in connection with the refinery? In the first place, is the refinery dusty with the wind in certain directions?—I do not think the wind has much influence on the refinery in itself, but it may blow smoke towards it from other parts.

1042. I take it that smoke would also include light dust?—Yes. The road dust would not blow about, because that is taken care of.

1043. You have made a considerable study of the conditions in the works. Are the conditions in certain parts of the plant worse when the wind blows from certain directions?—Yes.

1044. Can you give us any information as to the parts affected by the wind and in which direction the wind is the worst?—On the bottom floor conditions are affected by the wind. An east wind would be bad for the bottom floor, as it would blow out any smoke toward the men.

1045. A wind from the north-east or south-east would act in the same way in a partial degree?—Yes, but an east wind is the worst.

1046. Are there any other parts of the works where men are employed in numbers where the wind affects the conditions?—A south wind is the best for the H.-H. plant. A north wind would affect the position and carry the smoke back to the men.

1047. What about the zinc roasters?—I do not think the wind has any particular effect there, because the men are all around the furnace.

1048. Does not the wind affect the position by blowing fumes to the men in the slag pit?—If any acid fumes are coming off they are carried about. They would not be carried far toward the slag-pit, however.

1049. *By Mr. Gepp*—In connection with the cleaning down of buildings, you have indicated that, particularly in view of the old type of buildings, it has been rather a difficult problem to solve?—Yes.

1050. You said that a vacuum apparatus is being tried?—Yes.

1051. Mr. Pearson seems to have put out rather an interesting suggestion, namely, the installation of a travelling vacuum apparatus like that used in big cities for the cleaning of houses, walls, carpets, &c.?—Quite so.

1052. The point Mr. Pearson particularly desired to bring out was that if the vacuum tests indicated success, would you give favorable consideration to a recommendation to look into the permanent installation of a motor vacuum travelling apparatus to deal with places where otherwise it would be difficult to remove the dust?—I have already mentioned the matter of such affairs as one sees in cities, but there is this difficulty, The vacuum cleaner is all right when handling absolutely dry and dusty material, but we do not know whether our heavy material would be transported successfully by vacuum. I have heard of experiments made in dealing with concentrates where, owing to the moisture the pipe became clogged. Unless the material was absolutely dry the machine would not work. If the experiments we are making prove successful I have no doubt the company would consider the matter most favorably.

1053. We know that material like wheat, coal, and other heavy material is successfully transported by suction apparatus, therefore the type of apparatus should be the only thing to consider?—I suppose so.

1054. So far as the type of motor was concerned, the operator could judge whether it was suitable to operate at a particular place or not?—Yes.

1055. You mentioned the question of the wetting down, once you have a place clean, of the wall. wall purlins, and rafters?—Yes.

1056. Is there any serious difficulty in spraying very fine material? Does not the water tend to run off?—The very fine material will form globules when sprayed and run off.

1057. That is one of the serious troubles of using water sprays on fine material?—Yes.

1058. I trust this matter will have your studied attention to see if it can be applied?—I am reporting thoroughly on the question now. Every detail is being considered.

1059. *By Mr. Pearson*—When asking about the zinc roasters I omitted to ask about the moistening of the material around the zinc-roasting plant. I refer to the stock piles of concentrates prior to treatment?—There is a water service alongside the unloading belt with a long hose that can be used on those concentrates. The only calcines about the plant are in the shape of cleanings up and flue dust, which are wetted down before being handled; in fact, they are hosed almost into a pug.

1060. The product as it comes from the roasters is moistened as soon as it is cool enough?—There are conveyors of the push-plate type running from all the furnaces, and the material is pushed along these conveyors until cool enough to be moistened by a spray without causing steam.

1061. It is moistened down sufficiently to make no dust whatever, delivered into bins, and taken to the wharf?—Yes, on lines I have previously dealt with.

1062. The stock piles of zinc concentrate are kept continually moist?—Yes.

1063. With regard to the zinc-roasting plant, do you know the work now proceeding to reduce the amount of dry material in the plant?—Yes.

1064. You know that it is hoped to eliminate altogether dry ore from the feeding side of the furnace?—Yes.

1065. This work is being very actively pursued?—Yes. The material will be moistened to such an extent that it will be transported without dusting. I cannot give the Commission the average moisture content of the zinc calcine.

Mr. Gepp—It is about 8 per cent.

The witness withdrew.

ARTHUR ROBERT DYCE WATSON LEONARD, health inspector for the corporation of Port Pirie, Town Hall, Port Pirie, was sworn and examined:

1066. *By the Chairman*—Under what Act of Parliament are you appointed?—The Health Act of 1898.

1067. What was the date of your appointment?—July, 1917.

1068. The Commission desire the benefit of your experience in regard to health conditions here. We recognise that success in the operation of any industry depends primarily on the sound health of the employees, and one large factor governing health is the occupation of good homes. Can you say from your observations what is the general position of housing in Port Pirie, in the matter of the type and number of houses?—Houses in Port Pirie may be divided into two types—stone and brick and wood and iron. The best class of houses are the stone and brick, but there are also a large number of good-quality houses of wood and iron. There are also wood and iron houses of very poor quality . There are about 12 houses of very poor quality indeed in the town out of a total number of 2,583, not including shops which have no dwelling accommodation.

1069. Are the houses which you class as a very poor type occupied by British or foreigners?—As a rule the poor quality places are inhabited by foreigners.

1070. Will you give us a statement covering your duties and responsibilities on the question of housing, also concerning the powers with which you are vested?—I have full powers to enter any house at any time during the hours of daylight, say, from 9 a.m. to 6 p.m., and any business while it is being carried on. My duties are to see that houses are kept in fair habitable condition. I supervise them by visiting them from time to time, and telling the occupants where necessary what to do and how to improve the conditions. If necessary I serve a notice on the owner to carry out improvements. That I have power to do. Of course, I have not the power to do everything. We have no Building Act in operation in the town, and there are many things which I cannot order to be done, but which I can get done by a little tact or exercising the personal factor. I have had several houses taken down by the owners where I considered them not fit for human habitation. I could not order

them to be taken down, but after the facts had been presented to the owners they agreed to what I wanted, and the premises disappeared. Generally speaking, the state of houses in the town ranges from good and fair to indifferent. The majority are in a very fair state.

1071. Can you give us any information as to the living habits of the foreigners?—They may be divided practically into four classes. There are those who live in bachelor quarters, and they are generally the most careless. Usually they are single men or widowers, and they go into bachelor quarters and look after themselves. The landlord, as a rule, is not there. Men of this class are the most difficult of all to manage, as they are careless in their ways, their food preparation, and so on. Next are those who go into what are called barracks. Young unmarried fellows take a whole house, and they "barrack" or sleep in different rooms. Some of them are very clean, others are passably so, and as a rule there is not much trouble with them. Young fellows who live under the barrack system generally go in for the best of food, whereas men in bachelor quarers are as a rule content with the cheapest food they can get. They purchase threepennyworth of bones for soup, a fry, or bit of liver, or something of that sort.

1072. They eat a fair amount of meat?—Yes; but it is always the cheapest kind, and they go out into the country and kill sparrows and other small birds, and make them into pies. They have the idea that their particular job is to save money for drink or some other purpose, so they do not put much into actual living. A third class are married couples who hire rooms at a boardinghouse kept by English people generally. These live fairly well. Then there are married people who have houses of their own. Some of these are well kept, whereas some of the people have slovenly ways, and do not feed well.

1073. Are the last few classes you have mentioned as a rule cleanly in their habits or otherwise?—The bachelor quarters are seldom clean. The barrack men are nearly always clean. If there is one fault with them, it is that they have been used to earth floors in their own country, and do not realise that wood floors have to be scrubbed from time to time, and I have to serve them with notices to clean floors and walls. Generally they do not have much furniture, their beds consisting of blankets rolled out on the floor. In the morning they air their blankets outside, then stack them around the wall, and it is possible to see how many sleep in a room. As a rule not more than four sleep in a room. I do not permit more than four. There may be seven or eight of these men in a house. There is no real overcrowding among them, as if I find too many I tell them that some must go out. They are not too particular in regard to their sanitary arrangements, and want a great deal of looking after in that respect. It takes more time to look after the foreigners in this connection than all the Britishers put together. Some of the married folks have bought houses of their own. There is a lot of property in this town owned by foreigners. Generally those who have any money have decent homes. There are people who sublet to foreigners, and do not look after them at all. They leave me to do the looking after.

1074. Are the houses in the main fairly clean?—Yes. From time to time I have to go and serve a notice to have a floor cleaned, or walls cleaned down.

1075. I suppose a house would have to be in a pretty bad state to oblige you to adopt that course?—I do not allow them to go too far. Since I have been here the town has been improved in health, and I am not running any chance of letting them go without supervision. I am generally on the spot, and when I think it is time for something to be done I serve a notice. As a rule they obey orders. In my opinion the actual living conditions have not so much bearing on the question as their mode of spending their spare time. They never go in for sport. Most of their leisure is spent at their own cafes or clubs, playing cards and billiards all night long, and many of them get home in the early hours of the morning on a crooked path.

1076. Do they do much drinking?—Yes; of light wine.

1077. *By Mr. Pearson*—"Pinky?—I do not know.

1078. *By the Chairman*—Have you had any opportunity of observing their laundry arrangements, especially those of the bachelors?—They generally wash their own clothes and hang them out in the yard.

1079. Do they wash them with any degree of regularity, or only as occasion demands?—I do not think they are regular in their washing of clothes, or their ablutions either. I generally see them come from their work and prepare a meal without washing.

1080. Are you of the opinion that any considerable percentage of them live in their working clothes after work?—Except on Sundays I have never seen them out of their working clothes. If they took part in sports, or had some interest in gardening, it would help them to keep in a better condition of health. They do not, however, go in for anything of that sort. They go to work and back, prepare their food, and are then off to cards or billiards, or to sit on a kerb. One seldom sees them in the open except on a kerb. There are one or two exceptions. A very decent lot live in Federation Road, who wash their floors without being told, and the neighbors speak highly of them as being decent in their ways. I am sorry that I cannot say the say the same of foreigners in the gross.

1081. *By Mr. Robinette*—You said they only wear their good clothes on Sunday?—No; I said I only noticed them in their good clothes on Sunday.

1082. There are two foreign tailors in the town?—I know of one. There may be two.

1083. Are not some of the foreigners the best-dressed men in Port Pirie?—I believe they are when they are in their best clothes.

1084. To which particular nationality do you refer?—I refer to them generally. I do not go about looking for fellows in good clothes. My time is taken up with my official duties. I do not wish to infer that they do not go in for good clothes or that they have not got them.

1085. You say you have seen them going home on a crooked path. Have you seen much of that?—Only at night. Sometimes I have had to get out of bed and steer them home, as they have been making such a row when going home.

1086. *By Mr. Gepp*—Are there different types of foreigners here?—Yes; Italians, Greeks, Bulgarians, Serbs, Maltese, and so on.

1087. Do the Maltese live together, or are they scattered throughout the town?—They are scattered.

1088. From your experience of the Maltese, have you any particular point to give us with regard to them?—I include them with other foreigners. They do not stand out in any way.

1089. What standard of hygiene have foreigners when they arrive in Port Pirie from Europe?—They have primitive ideas, and have to be taught a lot.

1090. That makes it very difficult for you in your position?—Yes; that is why it takes so much time.

1091. Where can we get information as to the proportion of employees at the smelters who own their own houses?—The town clerk would give you that. A list of all ratepayers is kept there.

1092. Can you say that a large number of employees at the smelters do own their own homes?—I do not know. I do not know who the permanent employees at the smelters are, for one thing. The only time I come in contact with the men as owners is when I have to serve a notice, and hunt up their allotment.

1093. Would it be possible for you to show us a few sample houses such as you have described?—Yes.

1094. From the point of view of a large industrial centre, what is your personal and official view of the homes that are owned or available for rental for married men in this town?—They are very habitable, and in fair condition, because if a house is not in such condition I intimate to the owner that he must make it so before he rents it. There is one now being

made more habitable because of such a notice from me. Most of the twelve houses uninhabitable are so simply because I will not pass them until they are improved.

1095. Are there sufficient homes of a reasonable quality for men who would be prepared to settle in Port Pirie provided they had a permanent job at the smelters?—I think so. New houses are going up every day. Three were practically finished last week.

1096. Are the allotments connected with the houses reasonably sufficient for recreation such as gardening?—The majority are.

1097. Have they conveniences in the way of fences and water supply?—Yes.

1098. Do you think that, from the point of view of health, housing conditions in Port Pirie are reasonably good?—Yes. The houses are there and in reasonably good condition, and if there are any adverse factors they are the fault of the occupiers. If a person who goes into a house is not a first-class sanitary person, he can soon make the house second, third, or fourth class.

1099. Is the Act you are working under sufficiently all-embracing for all the purposes that you think you should serve?—No. I think there are lots of loopholes in it. I am prevented from doing many things that I should like to do.

1100. And which the council would like you to do?—Yes. I think the council would be only too pleased to have it much wider. I cannot deal with authority with any building. I can only do it by the personal factor, and by contact. I cannot say to a landlord, "You must improve your house in such and such a way."

1101. *By the Chairman*—You mean that neither you nor any other inspector can do that?—Yes. It is only conditions we can deal with, not material.

1102. Would it be in the interests of the health of the town if you had further powers?—Yes.

1103. Have you the power to declare a house uninhabitable?—No. I can make a report to the council, and it remains wih the council to do anything with it. But the Health Act does not give even the council much power. If we had a Building Act in conjunction with the Health Act we should have more power.

1104. *By Mr. Gepp*—If we wish to cover this matter generally in our report the best way would be to write to the town clerk, and ask the council to confer with us, or appoint a subcommittee to do so?—That would be a good idea.

1105. Are the opportunities for recreation reasonably good in Port Pirie?—Yes. There is ample space for the people if they like to use it.

1106. Do you deal in any way with the health of school children here?—It is included in my work. If there is anything wrong with the health of the school children I deal with them and with schoolmasters the same as with other people.

1107. Are the schools in a reasonably healthy condition?—Yes.

1108. Do you inspect the children?—No; only the buildings and the sanitary conditions attached. If I deal with the children at all it is in their homes under their parents' control. When they have infectious disease I give them instructions according to the Health Act.

1109. What is your relation to the health officer for the town?—I am under his control. I report to him.

1110. He is Dr. Yeatman?—Yes.

1111. You carry out any instructions he gives?—Yes; instructions from the health officer or the secretary to the local board of health.

1112. Do the Government arrange for medical inspection of the school children here?—I cannot say. I have not seen anything of it.

1113. Has there been dental inspection of the school children?—I do not know. I do not think so.

The witness withdrew.

WALTER HEWART JUDE, secretary Broken Hill Associated Smelters Accident Fund, Port Pirie, was recalled and further examined:

1114. *By Mr. Robinette*—Have you prepared the statement asked for this morning?—Yes. I hand in a statement showing the total number of claims in respect of lead poisoning for which compensation has been paid, and which have been admitted, for a period of six years and two months ended 11/3/25; also the average absence per beneficiary and benefits paid. It is extremely difficult to go through our old records and pick out these cases, because they were not kept so well as they could have been several years ago. I have lumped the seven half-years from 8/7/19 to 5/7/22 altogether. I did not think it necessary to waste much time going into the matter. There were only 14 claims, and the total time lost was 971 days, with an expenditure of £308 18s. 4d. From then on we have accurate data, and these have all been segregated into separate half-years.

1115. The number of claims for the year ended 9/1/25 on the statement you supplied this morning was 168; on this one it is 144?—Yes. The difference would be represented by claims that were rejected. This statement deals with claims that were admitted.

1116. *By Mr. Gepp*—The average time lost is decreasing. Can you account for that?—It is hard to explain. I know we used to have a good many men on the fund who were off for long periods. I have here for Mr. Robinette's examination several loose copies of the balance-sheets, one for each of the half-years since 5/7/22.

The witness withdrew.

The Commission adjourned.

Tuesday, May 5th, 1925, at 2 p.m.

[At Congregational Hall, Port Pirie.]

Present—

Dr. K. R. Moore (Chairman).
Mr. H. W. Gepp.
Mr. J. L. Pearson.
Mr. W. Robinette.

RANDOLPH YULE MATHEW, medical practitioner, Commonwealth Health Laboratory, Port Pirie, was sworn and examined:

1117. *By the Chairman*—What are your degrees?—M.B., B.S., University of Melbourne.

1118. What is your present position?—Medical officer in charge of the Commonwealth Health Laboratory, Port Pirie.

1119. How long have you held that position?—For 10 months.

1120. Prior to that you were trained in bacteriology and laboratory processes at the Commonwealth Serum Laboratory, Melbourne?—Yes.

1121. What are the functions of the laboratory in Port Pirie?—Its function is to render assistance in the diagnosis and treatment of sickness, such as can be used by the medical men of the district.

1122. You receive specimens for examination from the private practitioners of the district as well as from the public hospitals?—Yes.

1123. On the reports you make is founded in some measure the ultimate diagnosis of cases that are in their hands?—I presume so.

1124. I understand you have examined the blood of a good number of cases of lead poisoning. Can you give us some tabulated result of your findings in those cases?—Yes. I hand in a statement in regard to them (Exhibit 12).

1125. The total number of examinations shown at the top concerning nationalities does not necessarily refer to the number of different individuals?—No. Several examinations of one man may have been made. Nor are they necessarily cases that were diagnosed as plumbism.

1126. In these cases did the men come to see you, or did you go to see them?—The majority of the men were sent to me by the medical attendant. A number of specimens were procured by me from the hospital at the request of the medical attendant.

1127. Can you demonstrate Table 1?—It is divided into classes of 100 per cent. and over, 90 per cent. to 100 per cent., 80 per cent. to 90 per cent., and so on, and in each division I have put the number of men of each nationality whose blood contained a corresponding percentage of haemoglobin. On the right hand side is the average for the lot, and the bottom line gives the totals.

1128. *By Mr. Gepp*—Does Table 1 show the percentage of red corpuscles as compared with normal men, say, in the country?—It has no reference to red corpuscles. It refers to the pigment carried by the red corpuscles. All of the classes show a reduction in haemoglobin, but a fairly uniform amount of reduction. I divided the cases into nationalities because that was the only point outside of the blood examination of which I had complete records of all the men.

1129. What is the purpose of a haemoglobin estimation as an estimation apart from the red cell count?—Upon the presence of a requisite amount of haemoglobin depends to a certain extent the oxygen-carrying capacity of the blood. That is important in the carrying out of the functions of the blood.

1130. Do you know from your reading or experience whether there is any difference in the haemoglobin of various nationalities?—No.

1131. I notice that five Greeks have 100 per cent. or over?—These are not necessarily men who were ill; or, rather, they may not be ill to such a degree as to affect the blood.

1132. Do figures like 80 per cent. indicate anaemia, or does it only necessarily do so in conjunction with many other signs and symptoms?—The latter would be the more correct.

1133. *By the Chairman*—Will you demonstrate Table 2?—I have again divided the men into nationalities, as nationality was the only outside factor that we had information on in every case. The counts are divided into quotas of half a million difference to the cubic millimetre.

1134. What are the normal limits for ordinary healthy people?—From my own observation, between four and a half and seven million.

1135. *By Mr. Robinette*—In a healthy person would the variation be as great as that?—That is the variation from individual to individual, not in the same person.

1136. *By Mr. Gepp*—Is that due to age, or constitution, or heredity, or habits?—Largely to all of those factors.

1137. You mentioned basophilic degeneration. Is that an indication of anaemia?—It is recognised to be so by most authorities.

1138. Not necessarily of any specific disease?—According to most authorities, no.

1139. It is estimated by the use of certain stains and the counting of the number of red cells which have degenerated?—By observing them, and in some cases by counting them.

1140. In Table 2A you say these films show no evidence of basophilic degeneration. There is, I notice, a constant increase of red blood corpuscles in Table 2A over the averages given in Table 2. That would indicate, possibly, a certain degree of associated anaemia in cases showing basophilic degeneration?—That is what I would deduce from the figures.

1141. The anaemia might be due to many causes and many specific and different diseases?—I have not stated personally that the anaemia was there. When you asked me between what limits, I said between four and a half and seven millions. None of those on the average were below four and a half millions, but, of course, individual cases go below that figure.

1142. *By the Chairman*—In the last vertical column of these tables, according to your statement, there would be evidence of anaemia?—Yes. Another point should be brought out. If the limits are between four and a half millions and seven millions, a man with six millions possibly might be anaemic. We would not know what his original figure was. It might have been near the seven millions mark.

1143. *By Mr. Gepp*—If a man entered an industry and you examined him from the start and took a sample of his blood, and then 12 months later a blood test showed a definite reduction, it would help you in diagnosing whether the industry was causing him any trouble; that is, provided you had made a test of his blood before he went into the industry?—That is, provided other causes were excluded.

1144. Provided that his medical and physical history was the same, it would help you in ascertaining any posible effect of the industry upon his health?—Yes.

1145. *By the Chairman*—Will you give us the meaning of the words polychromatophilia, anisocytosis, and poikilocytosis, and of the phrase "proportional and morphological variation of leucocytes"?—Yes. Polychromatophilia is the alteration in the staining properties of the red blood cells; anisocytosis is the variation in the size of the red blood cells; poikilocytosis is the variation in shape of the red blood cells; and the phrase proportional and morphological variation of leucocytes relates to the variation in the proportions in the respective white cells and in the forms of the respective white cells.

1146. Would you define and explain briefly the significance of normoblasts?—A normoblast is a red blood cell which normally is found in the bone marrow. On its entrance to the blood stream the nucleus which it contains is extruded. In the event of a rapid call being made by the body for red blood cells immature forms are sent out. The presence of normoblasts in the circulating blood is evidence that this is taking place.

1147. Will you define basophilic degeneration?—Yes. Basophilic degeneration is evidenced by the finding in a stained blood film of numbers of red blood cells which stain in an abnormal manner. In the substance of the cell are scattered fine granules which have taken the basic portion of the stain and appear as dark specks under the microscope.

1148. *By Mr. Robinette*—Does this table give the total number of blood examinations you have made?—It gives the total number of men examined who worked at or had been working at the smelters. I made examinations of men and women quite apart from industrial work, but I did not include them in the list.

1149. Do you receive blood specimens from the private practitioners without seeing the men personally?—For these tests, No. The men come along. Apart from these tests we do. For instance, there is the Wassermann test for syphilis. In such cases we receive a specimen of the blood from the doctor without seeing the patient, but it is totally different in regard to the cases enumerated in the tables.

1150. In all cases of examination for lead poisoning you see the patients?—Invariably.

1151. Do you receive any information from the private practitioners concerning the patients, such as their industrial history, etc.?—In some cases, yes. It would be as well to state, perhaps, that the routine is to forward a printed form with the patient. This is the universal practice in the health laboratories throughout the Commonwealth. With any specimen submitted to us it is required that the prescribed form be submitted with it. On that form certain data are asked for. It is not always supplied, but I generally fill it in myself as much as I can for the sake of records.

1152. Have you a copy of those forms to put before the Commission?—I will supply one.

1153. Is it necessary to have those data in order to take those tests?—It is not necessary for taking the tests, but in order to carry out my duties as medical officer in charge of the Commonwealth Health Laboratory I am required to keep records.

1154. Do you confer with officials of the Broken Hill Associated Smelters in regard to blood tests?—No. The report I make is given to the medical attendant. I deal entirely with medical attendant and patient, and my reports are given to the medical attendant.

1155. You do not give the company's officials any information whatever?—No.

1156. Do you give the man a duplicate of the result of the test?—No. I have done that, but not in all cases. I would give it at the request of the medical attendant.

1157. If a man asked for it, would he get it?—I have done it, but I do not do it now.

1158. For what reason did you cease to give these duplicates?—I looked at it in the light that the report in the first place was submitted to the medical attendant, and a subsequent report should therefore be submitted to him.

1159. You think the man has no right to know his condition at all?—I do not report upon his condition. The medical attendant deals entirely with him. It is not my place to come between him and his medical attendant.

1160. *By Mr. Gepp*—I understand that your position is more in the way of giving reports on samples of blood submitted to you from various people rather than making diagnoses of particular conditions?—It is.

1161. Have you given any consideration to the question of plumbism in Port Pirie from the standpoint of the results you are obtaining?—I have.

1162. Do you think this to be correct—"That the frequency of basophilia in the blood of persons with lead poisoning is is such that in the absence of other symptoms it should be regarded as an alarm signal, and should place one on guard against latent lead intoxication"?—I am not in a position to give that a proper answer.

1163. Have you any figures at all from very serious lead cases in regard to the diminution of haemoglobin? Figures are given in some of the literature as low as 2,800,000?—I think you have confused that. That is the count of the red cells. I have counted as low as 3,800,000.

1164. Was that case regarded as a serious one?—As far as I know, it was.

1165. From your point of view, would you agree with or comment upon the following:—"Among the alterations of the blood the diminution in haemoglobin and in the number of red cells, and the inversion of the leucocytic formula, certainly from the point of view of the early determination of saturnism, are less important than certain alterations of the red cells"?—I could only give you opinions which I have read, but not from my own personal experience.

The witness withdrew.

HUGH RALPH SUMMERTON, turner and fitter, 65, Gertrude Street, Port Pirie, was sworn and examined:

1166. *By Mr. Robinette*—You are secretary of the Port Pirie branch of the Amalgamated Engineers' Union?—Yes.

1167. How long have you been employed on the smelters?—About 20 years. I started there in 1900. I left in 1912, and returned in 1919.

1168. What is your opinion of the conditions now in regard to dust and smoke, compared with when you first started at the smelters? Is there a greater or lesser amount now?—From 1900 to 1912 I did not take much notice of the dust.

1169. From 1915 or 1916, how does it compare with the present?—I could not altogether answer that, as I have not taken that much notice of the dust.

1170. A number of the members of your union receive dirt money in respect to places in which they work?—Yes.

1171. Has the number of such places increased recently?—It has since 1919.

1172. Has the number considerably increased?—Yes. Between 1920 and 1921 we accepted 1s. a day for shift fitters in the Dwight & Lloyd plant, but after 12 months the members who were working there complained so much that we had to approach the company with a view to getting an increase in rates, which was granted to us.

1173. Since you got that increase has the number of places in which you receive it increased?—It has, for the simple reason that they have built extra plants, that is the Barrier and acid plants. In the acid plants we do not get the increase for dirty work, but on account of the acid.

1174. For the obnoxious nature of the work?—No; simply on account of the burning of clothing by the acid.

1175. Have you any figures as to the number of cases of lead poisoning amongst your members?—Five members have suffered since 1923.

1176. Do you know of any cases of lead poisoning amongst your members previous to 1923?—No.

1177. Is there anything else you can advise the Commission upon, regarding the working conditions of your members, or whether improvements could be effected that would minimise the health hazard?—Yes; there are occasions when a breakdown occurs in the Dwight & Lloyd plant, when the men are asked to get into the work immediately, and in some cases that plant has been running anywhere from three to six months or perhaps longer, which means that during all that period dust has been accumulating on that machinery. When those men touch that part of the machinery they get a lot of dust all over their clothes. Instead of having a clean suit of overalls after finishing the job, so as to continue in their usual work, they work in them for perhaps a week or a fortnight, which means that every time they touch those dungarees they get a certain amount of dust on their fingers and elsewhere, and when they shake them there is so much dust that they inhale some of it.

1178. What would you suggest?—In case of breakdown, as soon as a man has finished that job he should have clean dungarees to put on until such time as the others are washed, so that he will not have to wear dirty dungarees for any lengthy period. I do not know of any such place except the Dwight and Lloyd and the Skinner machines. Of the five men I mentioned four worked in the Dwight & Lloyd plant.

1179. Where did the fifth work?—He is a man who served his apprenticeship there. He has been there 15 years.

1180. Were all these cases compounded?—Yes, except the fifth. That man is waiting for the six months to elapse.

1181. He is still off lead work?—Yes. He is the only man who has suffered from lead poisoning for any time. Of the five men, No. 1 started at the smelters in July, 1918, and died in March, 1923. He received compensation. He was about 57 when he died. No. 2 started in June, 1919. His case was compounded in January, 1924. He was between 45 and 50 years old. No. 3 started in June, 1917. His case was compounded in February, 1925. He was between 40 and 45.

1182. *By Mr. Gepp*—Only one of the five men died?—Yes. No. 4 was working in the Port Pirie smelters in April, 1919, but I could not trace the day he came. He was working here before he went to Broken Hill in 1919. His case was compounded in March, 1925. No. 5 is about 28 years old now. He started at the smelters either in 1911 or 1912. He is still away with lead poisoning. He was away with lead poisoning in 1924. He took bad while away, and the doctors said he was suffering from some sort of rheumatism. The union sent him to Adelaide, where a specialist certified that he was suffering from lead poisoning. After the Pirie doctor saw that certificate he decided to give him a good overhauling, and sent a blood specimen to the laboratory, which proved that he was suffering from lead poisoning.

1183. *By Mr. Robinette*—In what places did No. 5 work?—He was working anywhere about the works. He did not, to my knowledge, put in any lengthy period on the Dwight & Lloyd plant. I do not know of what nationality three of those five men are.

1184. How many members of the A.E.U. are working on the smelters?—About 110. We cover fitters, turners, blacksmiths, barmakers, angle iron smiths, plumbers, electrical fitters, electricians, and wiremen. About 25 of the 110 are apprentices.

1185. Have you anything to add?—We get very well treated by the management, but some of the foremen seem to be a little against giving us the concessions that the company has granted, such as dirt money in special places. Though the company is prepared to pay it, we sometimes have difficulty in getting the foremen to be just to us.

1186. *By Mr. Gepp*—When was the first of the five cases of lead poisoning you mentioned?—In 1923.

1187. What number of your members have passed through the works since 1918, or are now in the works?—About 228.

1188. Can you get particulars of the labor turnover for me?—Yes; I will get them.

1189. You said the increase in dirt money was due to an increase in the plant. Might it not be due also to a certain extent to your representations to the company from time to time that another place ought to be brought under the dirt-money category?—It is only natural that the organisation will better the conditions as it goes along. We come across different points and learn different things, which naturally brings about better conditions.

1190. Whenever you have a point to bring up do you find the management willing to see you and sympathetically inclined to discuss the matter fully?—Yes. They are very just.

1191. The appointment of Mr. Dey with fuller powers than before is also welcomed?—By the organisation, yes.

The witness withdrew.

LESLIE GEMMEL TASSIE, medical practitioner, Port Pirie, was sworn and examined:

1192. *By the Chairman*—What degrees have you obtained?—M.B., B.S., Adelaide.

1193. What appointments do you hold in Port Pirie?—Acting medical superintendent at the Port Pirie Hospital, deputy and assistant quarantine officer for Port Pirie, and medical referee under the Workmen's Compensation Act.

1194. How long have you been in practice in Port Pirie?—Since the end of 1912, with the exception of a period of absence on active service.

1195. During your practice here I presume you have paid considerable attention to the question of lead poisoning?—Yes.

1196. Have you observed an increase in the number of cases coming under your notice in recent years?—Yes.

1197. Can you give an approximate idea of the time when the increase was first noticed by you?—From memory, about 1921 or 1922.

1198. Can you assign any apparent cause?—No.

1199. Do you think it possible that modern research and aids to diagnosis have resulted in the detection of a larger number of cases that were formerly diagnosed as chronic gastritis, chronic bronchitis, or such diseases?—It is quite possible that modern methods of diagnosis have assisted largely, and been of great value in the diagnosis of lead poisoning.

1200. Can you give us an idea of the number of cases of lead poisoning from the smelters that you have seen in a period of, say, a year?—I cannot give any figures further back than the middle of 1924. From the middle to the end of 1924 I certified 19 cases as suffering from lead poisoning, and from the beginning of this year to the present time, 34, making a total of 53 since June, 1924.

1201. Can you give us the approximate proportion of mild and severe cases in these 53?—I would class only six of them as severe.

1202. Were the bulk of the cases acute or chronic? By "acute" I mean fulminating cases, with an exceptionally short duration of symptoms?—A few would be of the acute type, but the majority I would class as sub-acute cases. I would not class them as chronic, because I would call chronic cases those that are far advanced, and in which the patient will not recover.

1203. What is the ratio of Britishers and foreigners among the 53?—There were eight British and 45 foreigners.

1204. Did you observe more severe types of attack in British or in foreign cases?—One would see the severer form oftener in the British.

1205. Can you explain that?—By severer type I mean a case which is approximating or has reached the condition I have just described as a chronic lead case. I have seen more of such cases among Britishers, possibly on account of the longer service they have had in the works compared with the foreigner.

1206. Do you think the British subject is liable to reach a stage of intoxication at a later date during continuous work than a foreigner?—I would not care to express an opinion on that.

1207. In your opinion does length of service at the smelters bear a direct ratio to the incidence of the affection?—Yes. From some years' experience I should say that the incidence of affection is in direct proportion to the length of service.

1208. Have you made any observations as to the relation of physique, condition of nourishment, and history of alcoholism to the incidence of plumbism?—I have not made any particular investigation into those matters, and cannot speak on them apart from anything I may have noticed incidentally in my examination of the patients.

1209. Do you consider that there is a racial variation existing concerning the question of the incidence of plumbism?—The only way I could speak would be on the figures I have quoted, which show an incidence of 45 foreigners to eight Britishers. I think those figures speak for themselves.

1210. Have you observed any cases of plumbism among the sections of the population not employed at the smelters?—No.

1211. What are the prevailing symptoms complained of by persons afflicted with plumbism in your experience?—In my experience the more usual symptoms complained of are weakness and lassitude, sleeplessness, loss of appetite sometimes associated with vomiting, abdominal colic and constipation, and pains in the extremities.

1212. In your experience I presume you have noted varying types of the disease. If so, will you describe the prevailing signs elicited from those main types?—I will first describe the abdominal type, in which the prevailing system would be abdominal colic and constipation. Then there is the anaemic type, in which the prevailing indications are anaemia and other associated blood changes. Then there is the neuritic type, in which the prevailing symptoms complained of are pains in the extremities, and the signs found are tenderness over the main nerve trunks, and muscular wasting. The fourth type might be classed as the cerebral type, with signs and symptoms of acute brain involvement; and, lastly, there is the arterio sclerotic type, in which the symptoms would be signs of arterio sclerosis and chronic nephritis.

1213. Does, in your opinion, one particular type prevail in the cases you have seen?—Among the cases I have seen, what I have classed as the neuritic type would prevail, but not unassociated with the symptoms of other types as well.

1214. Do you associate particular types of the disease with any given set of conditions relating to nationality, length of service, and so forth?—I would associate the arterio sclerotic type with long length of service. On the other hand, the abdominal type might arise in a very short period of service or might occur at any time during a more or less long length of service.

1215. Do you consider that intercurrent ailments have a determining influence on lead poisoning?—They certainly would have an influence.

1216. They would tend to predispose to an attack of lead poisoning?—Yes.

1217. In the matter of diagnosis of the complaint I should be glad if you would give the Commission a short narrative concerning that point?—First, one would take into consideration the industrial and medical history, both past and present, of the man; then his symptomatology; then the results of an examination held with a view to eliciting any known signs of lead poisoning, and from a summary of the whole a diagnosis would be arrived at.

1218. Do you hold any opinion concerning the value of basophilic degeneration in blood films as an aid to diagnosis?—I consider it of value as an aid to diagnosis.

1219. You informed us that one of your appointments was that of medical referee in connection with the Workmen's Compensation Act. In your opinion does the present scheme of certification under the Act operate to the best advantage

of cases of plumbism?—Speaking as a general practitioner I do not consider that certification in its present form operates in the best interests of any one concerned. Especially do I refer to the certification of incapacity required for the purpose of redemption of weekly payments. I think that too great a responsibility is placed on the practitioner in this matter. He has to rely solely upon his own opinion and experience, and in the absence of any fixed standard upon which to work the estimates of the same cases of different practitioners must vary considerably.

1220. On the question of estimation of incapacity, can you advise the Commission as to any recommendations you would make personally to ameliorate the condition?—To my mind the first remedy is compulsory notification of cases of lead poisoning. The duties of the general practitioner should cease there. Any further steps taken with regard to the estimation of incapacity I consider should be carried out by a medical board, the chairman of which would be a medical man of experience in such matters, and which would have a fixed standard to gauge the estimate of incapacity.

1221. In what light would you regard the appointment of a medical officer at the works, to act as the company's medical officer?—I consider that the introduction of some form of industrial hygiene supervision is essential, and that such a scheme as that outlined by Mr. Somerset in his evidence is practicable, although, personally, I am doubtful whether one medical officer alone could carry out the work to the fullest advantage.

1222. *By Mr. Gepp*—The Commission is instructed to inquire first of all into the cause of the disease known as plumbism, secondly the reason for the recent increase in reported cases, and thirdly the best means of preventing or alleviating such disease. In this connection I should like your views as to the suitability for employment of foreigners in the industry. What do you think of their physique as compared with Australians and Britishers?—From my experience I find their physique to compare very favorably with that of the Britisher.

1223. Do you consider that the change of conditions, of food, and of work which occurs when these people migrate to Port Pirie and take up employment at the smelters is a factor affecting their general health?—I consider it must have some bearing upon their general health.

1224. *By Mr. Robinette*—You have not seen their living conditions in their native lands?—We know the climate is different from ours, and that here they cannot get the same food to which they are accustomed.

1225. *By Mr. Gepp*—From your consulting work and visiting their homes, would you say that their standard of diet and housing—not in all cases, of course, but among a substantial number—is likely prejudicially to affect their health?—Yes; that is, taking into consideration the work they are doing.

1226. Would it be a good thing not to admit brand new arrivals into the industry, but rather to take only those who have been in this country some time and have become acclimatised? Further, would it not be wise to insist upon a rigorous physical standard among prospective employees?—I am afraid I cannot answer the first part of the question, and I doubt whether my knowledge of the industry is sufficient to enable me to give an opinion on the latter part of it.

1227. Would you be in favor, in order to help the position, to a stringent entrance medical examination? Supposing you were medical officer at the works, would you recommend that?—If I were medical officer at the works I would recommend a medical examination to prove that men were fit.

1228. The reported cases among the Maltese are extraordinarily heavy. Our figures show 25 per cent. during the last half-year, which, at least, is nearly three times any other figure. Are there any special factors within your knowledge which would account for this?—No.

1229. If you were in the position of works doctor would you appreciate the assistance that an efficient dental service could render?—I would.

No. 57.

1230. Is it a fact that of recent years more and more importance has been attached by members of your profession to the condition of the mouth?—Yes.

1231. From your inspection of the mouths of your patients, would you say that in very many cases they would be greatly benefited by regular and efficient dental attention?—They would.

1232. In your experience has pyorrhea been a prominent symptom in cases diagnosed by you as lead poisoning?—It has been a symptom in a great number of cases.

1233. Do you consider pyorrhea a definite pre-disposing factor in lead poisoning?—Yes.

1234. I expect that you have a fair general idea of the working conditions at the smelters?—A very general one.

1235. Do you think that if regulations having statutory force were imposed upon employer and employee, requiring each to conform to certain approved rules of health, it would assist the position at the smelters?—I can only answer that question from my general knowledge of what I have read on the subject of lead poisoning, and what I have seen, and cannot answer it with a view to any of the conditions which exist at the smelters, because I know nothing of them. I consider that it would have a big bearing on the prevention of lead poisoning.

1236. When you answered the chairman's question regarding the effect of inter-current disease, did you cover such diseases as gout, syphilis, and so forth?—Yes.

1237. Those would be pre-disposing causes to an attack of plumbism in men who had either had previous attacks or had undergone lead absorption?—Yes.

1238. Do you agree that alcoholism, that is, the abuse of alcohol, is a potent factor in producing plumbism?—I have seen cases which have been made worse by the abuse of alcohol.

1239. *By Mr. Robinette*—That, of course, would occur in any disease?—Possibly.

1240. *By Mr. Gepp*—How far, if at all, does lead paralysis occur in Port Pirie?—I mean such things as wrist drop and foot drop?—Not very often.

1241. In the cases diagnosed by you as lead poisoning, has lead pallor been common?—Yes.

1242. In your opinion, what is the significance of the blue or Burtonian line in reference to workers in lead industries?—You mean how it should be regarded from the diagnosing standpoint in relation to lead poisoning?

1243. Yes. Do you regard it as a definite proof or only supplementary and complementary?—I would not regard it as definite proof of lead poisoning, but I would place value on it as confirmatory of other symptoms and signs.

1244. It is thought that there is pronounced fear among foreigners when they are out of their own country, and not in touch with their own people, or at least in the case of some of them reported as lead poisoned, and that this tendency militates against their recovery by auto-suggestion. Have you had any experience of this?—No.

1245. Have you ever considered the question of the psychological effect upon men of the idea given to them of the lengthened period during which they would be ill from lead poisoning?—It is possible that such an effect would occur.

1246. You cannot say from your experience that this would be more so amongst foreigners at Port Pirie than amongst Britishers?—I think their nature is more emotional, and they are more prone to fear than Britishers, and therefore the effect upon them from the psychological point of view would be greater than upon Britishers.

1247. You gave figures showing a considerable number of extra certificates during this year. How far is that due to any extra number of patients you have had to deal with owing to the absence of one of your colleagues?—Possibly a large factor is the fact that I am doing double practice work and probably seeing double the number of patients this year in a month compared with the corresponding month last year.

The witness withdrew.

The Commission adjourned.

[At Congregational Hall, Port Pirie.]

On Wednesday, May 6th, 1925, at 10 a.m.

Present—

Dr. K. R. Moore (Chairman)
Mr. H. W. Gepp
Mr. W. Robinette
Mr. J. L. Pearson.

CARL EMIL DORSCH, Medical Practitioner, Norman Street, Port Pirie, sworn and examined:

1248. *By the Chairman*—What are your qualifications?—M.B., Ch.B., Edinburgh.

1249. How long have you been practising in Port Pirie?—Six months.

1250. During that time have you come across cases of lead poisoning?—Yes.

1251. Can you give some idea of the number of such cases?—Thirty-seven.

1252. Were the majority of those cases Britishers or foreigners?—The majority were Britishers. Eighteen were Britishers and 12 Greeks. The others comprised Scandinavians, Germans, and other nationalities.

1253. Did you see any severe cases of plumbism among the 37?—Yes.

1254. Was there a predominance of a particular type of plumbism?—I should say the type with neuritis predominated.

1255. *By Mr. Gepp*—Would you say that the majority of cases in Port Pirie, so far as you know about them, were of the mild or sub-acute type?—I should say they were of the sub-acute type.

The witness withdrew.

HENRY ST. JOHN SOMERSET, general superintendent of the Broken Hill Associated Smelters, was re-called and further examined:

1256. *By Mr. Gepp*—As the result of your previous evidence you have prepared some further tables for the information of the Commission. Some of them, I understand, were prepared at the request of the Commission. Will you please submit these tables and explain them?—Yes. Following the request of the Commission for the information given in Table M1, we now put in that table, together with Tables M, N, O, and P, which will give further detailed and analytical information for the benefit of the Commission. (Tables M, M1, N, O, and P put in and marked Exhibit 13):—

TABLE "M."—REPORTED CASES OF LEAD POISONING, 28/6/17 TO 31/12/24.

Department of Origin of Contraction.

Period.		Refinery.	Top Floor.	Bottom Floor.	Dwight and Lloyd.	Huntington-Heberlein.	Ropp Roasters.	Ore Discharging.	Slag Pit.	Skinner Furnaces.	Acid Plant	Service Depts.	Total.
28/6/17	Per cent.	(5·56)	(22·22)	(11·11)	(27·77)	—	(5·56)	(5·56)	(11·11)	—	—	(11·11)	(100·00)
to	No.	1	4	2	5	—	1	1	2	—	—	2	18
21/12/21	Per cent.	1·13	7·55	2·82	8·33	—	9·09	33·33	66·67	—	—	3·28	4·53
22/12/21	Per cent.	(16·67	(33·33)	(16·67	(16·67)	(8·33)	—	—	—	—	—	(8·33)	(100·00)
to	No.	4	8	4	4	2	—	—	—	—	—	2	24
21/6/22	Per cent.	4·55	15·09	5·63	6·67	5·00	—	—	—	—	—	3·28	6·05
22/6/22	Per cent.	(12·50)	(31·26)	(9·37	(25·00)	(6·25)	(9·37)	—	—	—	—	(6·25)	(100·00)
to	No.	4	10	3	8	2	3	—	—	—	—	2	32
20/12/22	Per cent.	4·55	18·87	4·23	13·33	5·00	27·27	—	—	—	—	3·28	8·06
21/12/22	Per cent.	(13·16)	(7·89)	(28·95)	(15·79)	(2·63)	(2·63)	(2·63)	—	(2·63)	—	(23·69)	(100·00)
to	No.	5	3	11	6	1	1	1	—	1	—	9	38
20/6/23	Per cent.	5·68	5·66	15·49	10·00	2·50	9·09	33·33	—	16·67	—	14·75	9·57
21/6/23	Per cent.	(25·49)	(5·88)	(25 49)	(21·57)	(7·84)	(1·96)	—	—	—	—	(11·77)	(100·00)
to	No.	13	3	13	11	4	1	—	—	—	—	6	51
19/12/23	Per cent.	14·77	5·66	18·31	18·33	10·00	9·09	—	—	—	—	9 84	12·85
20/12/23	Per cent.	(22·33)	(11·65)	(15·54)	(16·50)	(12·62)	(2·91)	(·97)	(·97)	(·97)	—	(15·54)	(100·00)
to	No.	23	12	16	17	13	3	1	1	1	—	16	103
2/7/24	Per cent.	26·14	22·64	22·54	28·34	32·50	27·28	33·34	33·33	16·67	—	26·23	25·94
3/7/24	Per cent.	(29·02)	(9·92)	(16·79)	(6·87)	(13·74)	(1·53)	—	—	(3·05)	(·76)	(18·32)	(100·00)
to	No.	38	13	22	9	18	2	—	—	4	1	24	131
31/12/24	Per cent.	43·18	24·53	30·98	15·00	45·00	18·18	—	—	66·66	100·00	39·34	33·00
Total	Per cent.	(22·17)	(13·35)	(17·88)	(15·11)	(10·08)	(2·77)	(·76)	(·76)	(1·51)	(·25)	(15·36)	(100·00)
	No.	88	53	71	60	40	11	3	3	6	1	61	397
	Per cent.	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00

Numbers in parentheses represent the percentage of all cases reported during the period indicated in the first column. Numbers not in parentheses represent percentages of all cases reported during the total period under review.

TABLE "M1."—REPORTED CASES OF LEAD POISONING, 20/12/23 TO 31/12/24.

Department of Origin of Contraction of Disease.

Department— / Period.		Refinery.	Top Floor.	Bottom Floor.	Dwight Lloyd.	Huntington-Heberlein.	Ropp Roasters.	Ore Discharging.	Slag Pit.	Skinner Furnaces.	Acid Plant.	Service Department.	Total.
20/12/23 to 31/12/24	No.	61	25	38	26	31	5	1	1	5	1	40	234
	Per cent.	26·07	10·68	16·24	11·11	13·25	2·13	·43	·43	2·13	·43	17·10	100·00

TABLE "N."—PAY ROLL, FORTNIGHT ENDED 11/3/25.
Length of Service in Relation to Nationality of Employees.

Nationality.		Length of Service—Months.										Years.					Total.
		– 3.	4/6.	7/9.	10/12.	13/18.	19/24.	25/48.	49/72.	73/96.	97/120.	11/15.	16/20.	21/25.	26/30.	Over 30.	
British	p.c.	(12·20)	(7·27)	(4·39)	(4·24)	(8·94)	(4·24)	(12·43)	(6·52)	(10·30)	(7·50)	(8·04)	(5·15)	(4·92)	(1·74)	(2·12)	(100·00)
	No.	161	96	58	56	118	56	164	86	136	99	106	68	65	23	28	1,320
	p.c.	64·14	35·04	53·70	47·46	53·88	63·64	72·25	81·90	88·89	84·62	86·89	97·14	98·48	95·83	96·55	66·98
Greek	p.c.	(9·67)	(35·08)	(9·67)	(12·71)	(16·02)	(4·97)	(6·63)	(2·21)	(1·94)	(1·10)	—	—	—	—	—	(100·00)
	No.	35	127	35	46	58	18	24	8	7	4	—	—	—	—	—	362
	p.c	13·94	46·35	32·40	38·98	26·48	20·45	10·57	7·62	4·58	3·42	—	—	—	—	—	18·37
Maltese	p.c.	(13·24)	(11·76)	(8·82)	(10·29)	(30·88)	(4·42)	(14·71)	(2·94)	(2·94)	—	—	—	—	—	—	(100·00)
	No.	9	8	6	7	21	3	10	2	2	—	—	—	—	—	—	68
	p.c.	3·59	2·92	5·56	5·93	9·59	3·41	4·41	1·91	1·31	—	—	—	—	—	—	3·45
Italian	No.	(19·24)	(26·92)	(4·81)	(5·77)	(15·38)	(2·88)	(16·35)	(1·92)	—	(1·92)	(4·81)	—	—	—	—	(100·00)
	p.c.	20	28	5	6	16	3	17	2	—	2	5	—	—	—	—	104
		7·07	10·22	4·63	5·08	7·31	3·41	7·49	1·91	—	1·71	4·10	—	—	—	—	5·28
German	p.c.	—	—	—	—	—	(5·56)	(11·10)	(5·56)	(16·67)	(22·22)	(16·67)	(11·10)	(5·56)	—	(5·56)	(100·00)
	No.	—	—	—	—	—	1	2	1	3	4	3	2	1	—	1	18
	p.c.	—	—	—	—	—	1·14	·88	·95	1·96	3·42	2·46	2·86	1·52	—	3·45	·91
Scandinavian	p.c.	(25·53)	(8·51)	(2·13)	(2·13)	(2·13)	(10·64)	(10·64)	(8·51)	(6·38)	(6·38)	(14·89)	—	—	(2·13)	—	(100·00)
	No.	12	4	1	1	1	5	5	4	3	3	7	—	—	1	—	47
	p.c.	4·78	1·46	·93	·85	46	5 68	2·20	3·81	1·96	2·56	5·74	—	—	4·17	—	2·38
Russian	p.c.	(5·00)	(10·00)	(5·00)	(5·00)	(15·00)	—	(25·00)	(10·00)	(5·00)	(20·00)	—	—	—	—	—	(100·00)
	No.	1	2	1	1	3	—	5	2	1	4	—	—	—	—	—	20
	p.c.	·40	·73	·93	·85	1·37	—	2·20	1·90	·65	3·42	—	—	—	—	—	1·01
Others	p.c.	(40·62)	(28·13)	(6·25)	(3·13)	(6·25)	(6·25)	—	—	(3·13)	(3·12)	(3·12)	—	—	—	—	(100·00)
	No.	13	9	2	1	2	2	—	—	1	1	1	—	—	—	—	32
	p.c.	5·18	3·28	1·85	·85	·91	2·27	—	—	·65	·85	·81	—	—	—	—	1·62
Total	p.c.	(12·73)	(13·00)	(5·48)	(5·99)	(11·11)	(4·46)	(11·52)	(5·33)	(7·76)	(5·94)	(6·19)	(3·55)	(3·35)	(1·22)	(1·47)	(100·00)
	No.	251	274	108	118	219	88	227	105	153	117	122	70	66	24	29	1,971
		100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00

The numbers in parentheses denote percentages of employees of the various nationalities who have been working for the periods stated.
The numbers not in parentheses represent percentages of the total employees of the different nationalities in the same column.

TABLE "O"—PAY ROLL, FORTNIGHT ENDED 11/3/25.
Ages of Employees in relation to Nationality.

Nationality.		Years.										Total.
		– 21.	22/25.	26/30.	31/35.	36/40.	41/45.	46/50.	51/55.	56/60.	61/–.	
British	Per cent.	(8·86)	(17·80)	(15·83)	(12·96)	(12·13)	(11·06)	(8·56)	(5·98)	(3·49)	(3·33)	(100·0 0)
	No.	117	235	209	171	160	146	113	79	46	44	1,320
	Per cent.	93·60	59·34	59·89	59·37	62·26	70·53	72·90	84·93	90·20	88·00	66·97
Greek	Per cent.	(1·38)	(26·80)	(23·20)	(18·51)	(13·81)	(6·91)	(6·90)	(1·66)	(·83)		(100·00)
	No.	5	97	84	67	50	25	25	6	3	—	362
	Per cent.	4·00	24·49	24·07	23·26	19·45	12·08	16·13	6·45	5·88		18·37
Maltese	Per cent.		(39·71)	(22·06)	(13·24)	(10·29)	(5·88)	(5·88)	(2·94)			(100·00)
	No.	—	27	15	9	7	4	4	2	—	—	68
	Per cent.		6·82	4·30	3·13	2·72	1·93	2·58	2·15			3·45
Italian	Per cent.	(·96)	(20·19)	(25·96)	(22·12)	(14·42)	(9·63)	(2·88)	(2·88)		(·96)	(100·00)
	No.	1	21	27	23	15	10	3	3	—	1	104
	Per cent.	·80	5·31	7 74	7·99	5·84	4·83	1·94	3·23		2·00	5·28
German	Per cent.			(5·55)	(16·67)	(16·67)	(16·67)	(16·67)		(5·55)	(22·22)	(100·00)
	No.	—	—	1	3	3	3	3	—	1	4	18
	Per cent.			·29	1·04	1·17	1·45	1·94		1·96	8·00	·91
Scandinavian	Per cent.	(4·26)	(17·02)	(10·64)	(10·64)	(27·66)	(23·40)	(4·26)	2·12			(100·00)
	No.	2	8	5	5	13	11	2	1	—	—	47
	Per cent.	1·60	2·02	1·43	1·74	5·06	5·31	.. 1·29	1·08			2·38
Russian	Per cent.			(10·00)	(35·00)	(20·00)	(10· 00)	(20·00)	(5·00)			(100·00)
	No.	—	—	2	7	4	2	4	1	—	—	20
	Per cent.			·57	2·43	1·56	·97	2·58	1·08			1·02
Others	Per cent.		(25·00)	(18·76)	(9·37)	(15·63)	(18·76)	(3·12)	(3·12)	(3·12)	(3·12)	(100·00)
	No.	—	8	6	3	5	6	1	1	1	1	32
	Per cent.		2·02	1·71	1·04	1·94	2·90	·64	1·08	1·96	2·00	1·62
Total	Per cent.	(6·34)	(20·09)	(17·71)	(14·61)	(13·04)	(10·50)	(7·86)	(4·72)	(2·59)	(2·54)	(100·00)
	No.	125	396	349	288	257	207	155	93	51	50	1,971
	Per cent.	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00

The numbers in parentheses represent percentages of employees of the various nationalities who have been working for the periods stated. The numbers not in parentheses represent percentages of the total employees of the different nationalities in the same column.

TABLE "P."—LABOR TURNOVER AND EMPLOYMENT.

Showing Average Daily Strength as Percentage of Total Turnover Each Half-year.

Half-year ended	23/12/19	23/6/20	22/12/20	22/6/21	21/12/21	21/6/22	20/12/22	20/6/23	19/12/23	2/7/24	31/12/24
1. Labor turnover	2,412	1,415	1,302	703	1,338	1,545	1,746	2,308	2,213	2,552	2,615
2. Daily average strength	*1,079	*651	*794	*419	*683	1,004	1,208	1,339	1,430	1,595	1,601
2 as per cent. of 1	44·73	46·01	60·98	46·30	51·05	64·98	69·19	58·02	64·62	62·50	61·22

* During these periods the Rotation Scheme was in operation. During the shut-down period from July, 1919 to August, 1921, owing to the Broken Hill strike and the fire at the D. & L., a labor Roster was drawn up, and the available work distributed among the men in order to minimise distress.

1257. Why do you call one Table M1?—It is marked Table M1 because it bears a very close relation to the information given in Table M. Table M1 sets out the reported cases of lead poisoning from 20/12/23 to 31/12/24, dividing the reported cases into departments of the origin of the contraction of the disease.

1258. Am I right in saying that the top line denotes percentages, and that the second line refers to the actual number of cases?—Yes.

1259. Your total is not the figure we have been previously working on. Will you explain that?—This total of 234 cases covers a specific period of 12 months only.

1260. The percentages on the top line, so far as you are able to follow, are the results from each of the different departments, but I presume there is some difficulty in this matter, as men go from one department to another to a certain extent?—I explained earlier in my evidence that these are the departments from which the cases were reported. It is absolutely certain that the disease did not originate in all cases under the heading in which it now appears. This is so because men change from one department to another in the works, and it is impracticable to say with certainty where the disease was originally contracted.

1261. What particular work does your service departments cover?—They cover all the construction and maintenance work throughout the plant, the wharf, and stables gangs and other similar services throughout the plant.

1262. Will you please deal with Table M?—Table M gives information very similar to that in Table M1, except that it covers a longer period, that dealt with being from 28/6/17 to 31/12/24. You will notice by scanning the period column that the period from 28/6/17 to 21/12/21 is bulked in one set of figures. That is done because there were very few cases during that period, the total being 18, shown in the last column. For the rest of the table the periods are shown as six monthly terms. In explanation of the table, taking the initial period in the refinery, there was one case. That case represented 5.56 per cent. of all cases reported during that period. Further, it represented 1.13 per cent. of all the cases reported from the refinery during the period under review, namely, seven and a half years. An examination of the table will show that by far the greater majority of the cases have occurred since 1922.

1263. For the benefit of the Commission any other point you have noticed from a study of this table might be submitted, because this is one of the most important questions the Commission is dealing with, namely, where the cases are occurring. We desire the most complete details so that we may trace what particular influences are causing the cases, provided, of course, the cases are proved finally as lead poisoning cases?—Personally, I do not place very much value on the information given in this table, for the reason that I cannot say definitely that the disease was actually contracted under the head under which it now appears. So that really the analysis of the figures might not necessarily disclose the true position.

1264. We do not ask you to admit either the accuracy of the diagnosis in all cases or the accuracy of these figures; but, assuming that they are correct for the purposes of discussion, it seems that the Commission should consider this table seriously, possibly with the view of consulting later with you and your experts on the possible causes of the high rates in some particular department. For example, it is pointed out that more than 60 per cent. of the cases in the refinery have occurred during the last 12 months. Provided that is so, it would indicate that a very close survey by yourself of those conditions is being made?—That is so, but I should like to point out that that peculiarity is in all the departments that appear in this table. The increase shown under the refinery heading is general throughout every department. Every one of the departments shows the same peculiarity.

1265. What I understand is that the increase is not specifically to the refinery, but is general throughout the various departments?—That is so.

1266. Will you now take Table N?—Table N shows length of service in relation to the nationality of employees, and does not deal in any way with lead poisoning. The figures are taken from the payroll for the fortnight ended 11/3/25. The points of interest in the table, to my mind, are the facts that if you will look at the British employees, for instance, you will see that 21.97 per cent. of them have had over 10 years of service. Further down the table you will see that 38.89 per cent. of the Germans have had over 10 years of service.

1267. You are making an addition of certain figures in the table to get those percentages?—Yes.

1268. This table indicates generally the long service of the Britishers, and the short service of nearly all the other nationalities?—Except the Germans, of whom 38.89 per cent. have had over 10 years' service. There are, however, only a very small number of employees in the German section, 18 altogether. Practically all the other nationalities, with the exception of the Scandinavians, show no man with a service of 10 years or over. The British table further shows 28.2 per cent. of the British were under 12 months' service, and in that connection I want to make an explanation. Within the last 12 months we have undertaken a great deal of new construction work, which has necessitated the employment of a considerably greater number of tradesmen and helpers. As most of the tradesmen we engage are British, this 28.2 per cent. is on the t ble greater than it would be had we had only normal employees at work.

1269. From this table may we draw the conclusion that the increase in the reported cases of plumbism is contemporaneous with the increase in the employment of men other than British?—It is contemporaneous with the greater employment of foreigners.

1270. *By Mr. Pearson*—By foreigners in this connection, you mean south-eastern Europeans?—Yes. I also want to point out that 67.13 of the Greeks have had under one year's service with us.

1271. Looking at the table, it would seem that few of these foreigners have had more than four years' service?—Comparatively few.

1272. *By Mr. Gepp*—Will you explain Table O?—It is an analysis of the payroll for the fortnight ended 11/3/25, having regard to the ages of employees in relation to nationality.

1273. That is the same payroll as you dealt with in Table N?—Yes. Taking the British section, for instance, this table shows that of the total men employed during that fortnight, that is to say, not the men employed on any one day, but the total labor turnover for that fortnight, 117 were Britishers under the age of 21 years or 21 years old. This 117 represents 8.86 per cent. of all the Britishers, and it further represents 93.76 per cent. of all employees aged 21 years or under for the period.

1274. That is to say, that most of the men under 21 are Britishers?—Yes; 93.76 per cent. of them.

1275. Which is the minimum position of the British at any particular age on percentages?—22 to 25 years old, which is almost identical with the period 26 to 35 years.

1276. That is to say, the minimum position of Britishers employed, and the maximum percentages of other nationalities are among men between 22 and 35 years of age?—That is so.

1277. Does this indicate also that practically all the men of mature age are Britishers?—The big majority are.

1278. In that connection, I would like to revert for a moment to Table N. Will you give me the number employed of 10 years' service or over, in total number, not percentages?—Altogether 290 Britishers out of a total of 1,320 have a length of service of over 10 years.

1279. How many of those have length of service of over 20 years?—116 Britishers have a length of service of over 20 years.

1280. What is the period of operation of this plant?—Since 1889.

1281. Will you explain Table P?—Table P sets out the labor turnover figures and the employment figures, comparing one with another for specific periods. That is to say, taking the half-year ended 23/12/19 the labor turnover was 2,412 men, the daily average strength was 1,079 men, and the daily average strength on the labor turnover was 44.73 per cent. You will notice, however, that there is a note affecting the figures 1,079 and several of the other figures in the table. The note states that during these periods the rotation scheme was in operation. During the shut-down period from July, 1919, to August, 1921, owing to the Broken Hill strike, and the fire in the Dwight and Lloyd plant, a labor roster was drawn up, and the available work distributed among the men in order to minimise distress, so that those figures are really abnormal where the letter A appears. For the rest of the table, they are, of course, normal figures.

1282. Do you know whether your average percentage of around 60 per cent. on the turnover applies more or less to industries of a similar character?—I have no idea.

1283. The population of Port Pirie, which is a big shipping port, is to a certain extent a floating population?—To a certain extent it is.

1284. That affects the question of turnover in industries working at such a port?—Yes; always. Furthermore, our labor turnover is affected by the fact that during harvesting and shearing operations certain employees leave Port Pirie to take part in those activities.

1285. I understand you desire to ask leave to make an addition to Table L?—Yes. We thought it would be for the convenience of the Commission if we added to the summary of Table L a special line setting out the average daily strength as shown on Table P. (Amended Table L handed in.)

The Chairman—That alteration may be made.

1286. *By Mr. Gepp*—In regard to the incidence of the disease, the Commission has been instructed to inquire, first of all, into the cause or causes, and, secondly, into the reason for the recent increase. You told us the other day that, whilst disclaiming any special knowledge on the medical side, you doubted some of the reported cases. We have been told within the last day or two that a considerable number of the cases are of the mild or sub-acute type, which probably have a short period of disability, after which the men can return to work. Can you, from your general knowledge and special interest in this matter, say as a layman that there has been an increase in the methods of diagnosis, and the points of the diagnosis, which might tend to explain to a certain extent the increase?—I understand that is so, but I have only hearsay to guide me.

1287. *By Mr. Robinette*—Where did you get that understanding?—For instance, I understand it has not been a general practice until lately to have blood examinations made of all applicants for certificates.

1288. *By Mr. Gepp*—When was the Government laboratory instituted here?—It started whilst I was away on my trip. Dr. Mathew came here some time during the last 12 months.

1289. *By Mr. Pearson*—Can you prepare against the return of the Commission to Port Pirie a table showing the number of cases of lead poisoning from January 1 to May 31, and the departments in which the disease was contracted, to complete Table M, but to be shown separate from that table?—Yes; I shall do that.

The witness withdrew.

The Commission adjourned.

Thursday, May 7th, 1925, at 10 a.m.

[At Congregational Hall, Port Pirie.]

Present—

Dr. K. R. Moore (chairman).
Mr. H. W. Gepp.
Mr. J. L. Pearson.
Mr. W. Robinette.

HENRY ST. JOHN SOMERSET, general superintendent, Broken Hill Associated Smelters Proprietary Limited, Port Pirie, was recalled and further examined:

1290. *By Mr. Robinette*—Have you the figures asked for by the Commission yesterday?—I have a statement showing the number and the nationalities of men not re-employed after having been certified free from lead poisoning. The total is 29, of whom 13 were Greeks, 5 Maltese, 4 Italians, 1 German, 1 Russian, and 5 British.

1291. Why were they refused employment?—Some were booked off before they got their lead certificates; others got their lead certificates while still actually in the employ of the company. Most of them had contracted lead poisoning after short periods of service with the company. Further, the whole of their records with the company, together with the facts that I have enumerated, were taken into consideration, and the men were not re-employed.

1292. You have not the names?—No; only the numbers. I was not asked for the names.

1293. I specifically asked for the names. Are you prepared to give them?—Yes, if the Commission requests it.

1294. You have no objection?—I think it inadvisable to do it.

1295. Why?—If a list of the names were submitted it might be necessary for me to elaborate on the records of some of the men, and that might militate against their getting employment elsewhere. Some have very bad records.

1296. What do you mean by "bad records"? Bad lead poisoning?—No. Drunkenness, bringing drink on to the works, etc.

Mr. Robinette (to the Chairman): I wish to lodge a protest against the names not being given. I consider that the evidence is no good without being substantiated. Obviously they wish to suppress the names.

1297. *By Mr. Robinette*—How do you know these figures are correct? Some of the cases occurred while you were abroad?—I have been informed by Mr. Woodward, who was acting in my place while I was away, that that is the list referred to.

1298. You do not know whether it is correct?—Of my own personal knowledge, no.

1299. *By Mr. Gepp*—Are your records always kept officially?—Yes.

1300. In producing such a list does not the general superintendent in every case have to rely upon his officers?—On the official records, yes.

1301. Were you not asked yesterday to nominate the officer of the company who could produce this list, and answer any questions in connection with it?—Yes.

1302. You nominated yourself because you were the officer of the company who has the responsibility of deciding in these cases?—When I am here, yes; otherwise Mr. Woodward has it. I also stated that either myself or Mr. Woodward would give the information desired.

Mr. Gepp (to the Chairman)—It seems to me that this Commission has no authority in connection with the enquiry into specific cases, or in connection with the action of the company in regard to any particular case; that the production of names in this instance would not, for that reason, be justified; that if any cases have been dealt with wrongly by the company that would be a matter for inquiry by quite a different body, with definite instructions, and not by this Commission; and that if there are specific cases which would illustrate the necessity for, or the fairness or otherwise, of compensation to men who have been refused employment, the Commission would doubtless consider the question if witnesses were produced.

Mr. Robinette (to the Chairman)—I contend that this Commission has the fullest powers to inquire into any individual case of lead poisoning. In my opinion there is a desire to suppress evidence on individual cases. It was obvious at the outset when the Commission met that there was a desire for suppression, and it was only because of my strong representations that the public and the press were allowed to be present to hear evidence.

Mr. Gepp—The case for the company has been very fully presented without any pressure from the Commission.

The Chairman—My conception of the terms of appointment of the Commission is that they do not allude to any individual cases.

Mr. Robinette—I respectfully differ. Lead poisoning occurs in individual cases, and we have full power to inquire into any case.

The witness withdrew.

CHARLETON YEATMAN, medical practitioner, 119, Florence Street, Port Pirie, was sworn and examined:

1303. *By the Chairman*—What are your qualifications?—M.B., B.S. (Adelaide).

1304. What are your appointments in Port Pirie?—I am health officer, honorary medical officer of the hospital, and certifying surgeon under the Workmen's Compensation Act.

1305. How long have you been in practice here?—Since the end of 1919.

1306. As health officer, I presume you have a good idea from visits to cases of the conditions of housing in Port Pirie?—Yes.

1307. What is the general condition of housing among foreign laborers?—I cannot answer merely by saying it is good or bad, as there is a wide variation according to the uses to which the houses are put. Many foreigners with families live very comfortably, and the state of their dwellings will compare very favorably with those of any other people in the town.

1308. From the standpoint of cleanliness, as well as other conditions?—I include that in the term. Single men and men who are batching together are not at all particular in their mode of living and in their general cleanliness and hygiene. On the whole, I should say that a strict eye is kept upon houses that are known to be occupied by people suspected of lapses of hygiene, and there is no general nuisance created by them.

1309. Do you observe much evidence of alcoholism amongst foreigners?—No; they appear to be a very sober community.

1310. During your practice in Port Pirie, I presume that you have paid considerable attention to the question of lead poisoning?—Necessarily.

1311. Have you observed an increase in the number of cases coming under your notice in recent years?—They certainly have increased in the last year. I am speaking without figures, but the increase has been noticeable.

1312. Could you assign any cause for this increase?—I should not like to offer any speculation not based upon sufficient knowledge.

1313. Do you think it possible that modern aids to diagnosis have resulted in the detection of a larger number of cases than formerly that might previously have been classed as chronic cases of bronchitis and gastritis?—I think it very likely. I myself have never varied my methods since I have been here, which has been a short time comparatively.

1314. Could you give an idea of the number of cases of plumbism from the smelters which you have seen from year to year?—I cannot give from year to year, as I have not the figures, but I have figures from June 1924 to the present time, the cases totalling 137.

1315. Could you give the Commission an approximate idea of the proportion of mild and severe cases in that 137?—I am unable to do that.

1316. Relating to the cases under review, were the bulk of them acute, sub-acute, or chronic?—Sub-acute.

1317. By sub-acute, to what particular set of conditions do you refer, or the particular type of case?—I should describe such sub-acute cases as exhibit pallor, blue lead line in the gums, evidence of loss of weight, complaining of lack of appetite, foul taste in the mouth, constipation and abdominal sense of unrest, with occasional exacerbations of colicky pain, loss of muscular tone, sleeplessness, and pains in the joints and limbs.

1318. What have been the proportions in your list of Britishers and foreigners?—I have divided them into southern Europeans and northern Europeans. Of the former there has been 64, and of the northern Europeans, which means Britishers, Scandinavians, and Germans, 73.

1319. In your opinion, does length of service at the smelters bear a direct relation to the incidence of infection?—Yes.

1320. Have you any observations as to the relation of physical condition by nourishment and history of alcoholism to the incidence of plumbism?—It is recognised, and my experience confirms it, that any bodily weakness or deterioration of health, due to any cause whatsoever, predisposes to the effect of lead absorption being produced. As far as alcoholism is concerned, I think there is a relationship, but it is not necessary to assume by any means that because a man has lead poisoning he is alcoholic.

1321. Do you consider that there is a racial variation concerning the question of the incidence of plumbism generally; do you think that some races are more susceptible than others?—I should not like to advance that proposition.

1322. Have you observed any cases of plumbism among the section of the population who have not been employed in the smelters or have not been so employed in the past?—Only one, which came from outside Port Pirie. It was the result of drinking beer which we found to contain a definite quantity of lead, due to the lead pipes it was drawn through.

1323. *By Mr. Robinette*—That was not a Port Pirie case? No.

1324. It came from the country?—Yes.

1325. *By the Chairman*—I take it, then, that it is your opinion that no cases of plumbism are caused in Port Pirie among the population other than employees in the smelters?—I have not seen the slightest evidence of it.

1326. Not as the result of fumes or other effects from the smelters?—No.

1327. What are the prevailing symptoms complained of by persons affected with lead poisoning in your experience?—It depends on the type of case.

1328. You notice varying types of the disease?—Yes.

1329. Can you describe briefly these main types?—I should prefer to classify them in this way:—Cases of lead absorption, cases of lead impregnation, and cases of lead intoxication. A case of lead absorption will merely complain of a vague feeling of not being as well as he should be; he may have colic and constipation, slight attack, and a certain amount of loss of appetite, but he is not disabled from doing his work. The case of lead impregnation will be such a man as I have described as a sub-acute case. Amongst the cases of lead intoxication I would class all those who have gone through the period of lead impregnation and are suffering from a chronic form of the disease, with the secondary effects of the lead on the organs and tissues of the body. Such cases would exhibit either gout and swelling of the joints, or the main effect might fall upon the heart, kidneys, and blood vessels. Other cases still have shown degenerative changes in the brain. In any individual case there is necessarily overlapping. One man may have gout and renal disease as well, for example, and later show brain changes.

1330. In your experience, does one particular type or another prevail in Port Pirie?—I have seen more of the sub-acute type, to be classified as lead impregnation, than any other.

1331. Do you associate particular types of the disease with any given set of conditions relating to nationality or length of service at the smelters, or any similar condition?—I should say lead absorption is usually to be regarded as likely in a man who has been at the smelters a particularly short time; a man suffering from lead impregnation has been there longer—months to several years—and in the case of lead intoxication, it is almost certain that he is a long service man in the smelters.

1332. On the subject of diagnosis, will you give the Commission an idea of the criteria of diagnosis in your opinion?—The diagnosis is based on all the available information one can get from the man, and one's own observation of him, and examination. The industrial history of the man, the history of his present illness, and the method of onset, and the symptoms, a full detailed clinical examination, and the results of special examinations of blood, are all co-related to enable one to make a definite diagnosis.

1333. Do you attach considerable importance to the question of blood examination?—It is a valuable part of the general examination.

1334. Regarding the Workmen's Compensation Act, you are a certified medical officer. In your opinion, does it operate to the best advantage of cases of lead poisoning at present?—As a certified medical officer I am merely called upon to examine a man who desires it. I issue to him one of two certificates, either that he is suffering from plumbism and disabled from doing his work, or that I am not satisfied that he is so affected as to disable him. I produce copies of the certificates I issue, and they show where my duties finish. I do not say how ill a man is or how long he is likely to be ill. I simply state the fact that I am, or I am not, satisfied that he is suffering from lead poisoning.

1335. *By Mr. Robinette*—Do you notify the company how long a man is likely to be off?—That has been done.

1336. That is in regard to your private patient?—If the company asks you for information you supply it?—Under the Workmen's Compensation Act, if a man has accepted certificates under that Act the employer is entitled to the results of the examination and certain information. That information, also, is definitely available to the man just as much as to the company, and he receives anything he wishes in the way of information from me.

1337. You know the Act pretty well?—I am not a lawyer.

1338. You have read it?—Yes.

1339. You know the company is given the right if it disputes a medical certificate to send the workman to another doctor?—I am aware that can be done by the company.

1340. Do you not think that the proper procedure for a doctor to adopt?—I do not think I have done anything improper.

1341. Do you not think it is proper for the company to get information from another doctor, and not from the patient's private medical man?—I am not going to decide what the company shall do, because I have not sufficient knowledge of the legal position so far as they are concerned. From my own personal standpoint I am unable to agree that the procedure has not been fair to my own private patient.

1342. Do you not think it is a breach of professional etiquette to give information concerning a patient to a third party?—I certainly do not. I do not recognise the conditions to be on all fours with the usual practice in that respect, and I do not consider I have done anything I should not have done.

1343. Do you not think it is a breach of professional etiquette for any doctor to give information to a third party concerning his private patient?—That is asking my opinion on a general proposition. I am not going to discuss that. I can only discuss a particular point.

1344. *By the Chairman*—As certifying medical officer are you called upon to estimate the incapacity of a patient?—No.

1345. *By Mr. Robinette*—You are not called upon to do it, but you do give that information to the company?—Of course I do, but not as certifying medical officer.

1346. *By the Chairman*—Do you hold any views concerning the appointment of a company medical officer for the care of the workmen at the smelters?—I say that some such scheme is very desirable.

1347. *By Mr. Robinette*—Would it be possible for a man to be leaded and not show any lead in a blood test?—Lead itself is not shown in the blood test, unless the lead is estimated by special methods. You do not see lead in the blood, but in most cases of lead poisoning I should say there are changes in the blood cells, which, being confirmed by other signs and symptoms, would lead you to believe that the man was suffering from lead poisoning.

1348. The positive result in a blood test is only confirmatory?—It would be confirmatory of other findings, but it would not be specific evidence of plumbism as compared with some other diseases. There are certain diseases other than plumbism which give very similar blood changes.

1349. *By Mr. Gepp*—Have you any knowledge that the foreigners eat large quantities of tinned foods?—I am unable to state that.

1350. In your opinion, would it be possible to contract lead poisoning through eating a large quantity of tinned food?—I have never met with any evidence to that effect.

1351. You know of Sir Thomas Oliver's work on industrial diseases?—I have read some of it, but I have not any particular knowledge of it.

1352. Sir Thomas Oliver, in an article in his new book called "Industrial Health," which was edited by Kober and Hayhurst and issued in 1924, states:—

Another accidental source of lead poisoning is food—especially tinned food. An acid fruit such as pineapple is particularly prone to attack the lead present in the solder of the tin. One of my worst cases of lead poisoning was that of a lady librarian. She suffered severely from colic and double wrist drop in consequence of having eaten almost daily for months tinned salmon.

From such an authority as that you would be fully prepared to accept a statement of that sort?—Yes, especially as it is agreed among authorities that any acid foods, salads, and lighter acid wines are more disposed to lead—to absorption and lead impregnation.

1353. It is also stated in the same book that lead is soluble

in olive oil. From such an authority you would accept that statement as the result of test?—I did not know of that particular statement, but I certainly would accept it from Sir Thomas Oliver's book.

1354. If proved by further evidence that a very large quantity of tinned foodstuffs is consumed by some sections at the works among the southern Europeans, it might indicate possibly a supplementary explanation of lead poisoning based upon this evidence?—I do not think so. I should say that was unimportant. One swallow does not make a summer, and one case quoted in Sir Thomas Oliver's book would not lead me to imagine such a thing as that.

1355. What would you suggest would be the best way to investigate a matter of this sort—by an analysis by the Commission of the tinned material?—I think the Commission's energies should be directed towards the smelters and the lead processes inside the works, not towards tinned foods outside.

1356. We are seeking for all causes of plumbism, and might not the consumption of large quantities of tinned foods be supplementary, provided it were proved there were recognisable quantities of lead in some of the products being consumed?—I think it would be a waste of time to investigate that phase. I do not think you would get anything of importance out of it.

1357. Has your number of cases increased during the last few months, owing to the absence of one of your colleagues?—Slightly so, perhaps. I could not estimate the number.

1358. From your inspections of the mouths of your patients would you say that in many cases they would be benefited by regular and efficient dental attention?—Many of them have dirty mouths. It certainly would improve their general health if they had them looked after properly.

1359. In your experience, has pyorrhea been a prominent symptom in cases diagnosed by you as lead poisoning?—In very many cases.

1360. You would consider pyorrhea a definite predisposing factor in lead poisoning?—No. I think a man with a septic mouth would so have his health impaired that he would be very likely to become leaded. He is a more likely subject to suffer from the effects of lead, but I do not think the fact that he had pyorrhea beforehand would operate, except so far as its effect on his general health was concerned.

1361. Does pyorrhea or oral sepsis give the same general condition of the blood as lead poisoning?—There may be secondary anaemia, but, in my own experience, the blood pictures have been distinct ones.

1362. In your opinion, what is the significance of the Burtonian line in reference to the workers in lead factories?—When the blue lead line, as distinguished from the false blue line, is present, it certainly shows that absorption of lead is taking place, and that the person is exposed to a lead hazard. After some experience, I believe I can distingush the false blue line from the blue lead line.

1363. From your general knowledge, would you say that new arrivals among foreigners are, as a rule, anaemic looking?—No. I have examined a number of them as to their fitness to enter the smelters. I should say they compare favorably with men of other nationalities. A number of them appear to be picked men who have been examined previously.

1364. What is their general physique?—On the whole, good.

1365. Do you notice much difference between northern-southern and southern-southern Europeans?—The Greek migrant is an immigrant. The northern European who comes here is often an ex-stoker from a ship. He very frequently shows an anaemic appearance because of the nature of his occupation. It is difficult to make a comparison, because we do not get the same class of person from each country.

1366. From your general knowledge as a result of your practice in Port Pirie, would you think it wise to insist upon a very rigorous physical standard amongst prospective employees at the smelters?—Yes. I think the men should be perfectly healthy before they are permitted to engage in that maustry.

1367. Would the appointment of a works doctor, employed full time on the job, be a good thing?—I think so. I think research is necessary, but I doubt whether one whole-time medical officer could do the work efficiently and thoroughly.

1368. If you were in the position of works doctor, would you appreciate the assistance that an efficient dental service could render?—That would be one of the means of improving general health that I would welcome.

1369. Is it not true that recently more and more importance has been attached by all members of your profession to the condition of the mouth?—It is recognised as one of the sources of ill-health.

1370. We have had reported to us an extraordinary number of cases of lead poisoning amongst the Maltese. Can you help the Commission in that connection?—I have no knowledge why they should suffer specially.

1371. From your knowledge of diet, can you tell us anything about the relative nutritive values in tinned food as compared with fresh food? Suppose you had the opportunity to live on either, which would you prefer?—Naturally, the fresh. Tinned food has had certain vital properties which exist in fresh food destroyed by the heat necessary for cooking and sterilisation.

1372. By "vital properties" you mean such things as vitamines?—Yes.

1373. And these are present to a much less degree in tinned and canned foods?—They may be entirely absent.

1374. In that way it would render the value of the food less than that of fresh food?—It would depend entirely upon whether the deficiency was or was not made up by other fresh foods taken at the same time.

1375. *By the Chairman*—Have you read any recent works on the subject of carbon monoxide poisoning in what we may term a chronic form?—Yes. I noticed recently that a great deal of the lassitude and muscular weakness and inability to work hard was said to be due to minute doses of carbon monoxide inhaled by men whilst working.

1376. Are the symptoms you mention all part and parcel of the symptom complex of lead poisoning?—Yes.

1377. Have you ever observed in the symptoms of your patients indications which would lead you to suppose that there was an excess of carbon monoxide in any parts of the smelters?—I have never been able to incriminate it. I certainly have thought of it.

1378. Might that be a contributing cause to disability?—I cannot offer a definite opinion.

The witness withdrew.

JOSHUA RETCHFORD, stores manager, Broken Hill Associated Smelters Co-operative Council, Port Pirie, was sworn and examined:

1379. *By the Chairman*—You are the officer in charge of the co-operative stores at the smelters?—Yes.

1380. The Commission want to obtain an idea of the quantity of tinned stuff which the foreign laborers at the smelters purchase. Do they customarily purchase large quantities from you?—Yes.

1381. What is the nature of the tinned foods they purchase?—Mostly sardines, what are called kipper snacks, salmon, and red herrings.

1382. Do they buy tinned fruit also in quantities?—Yes; they are big buyers of that.

1383. Are they appreciably larger buyers of tinned goods than the British laborers?—Yes; decidedly so.

1384. Are you willing to produce samples of the products consumed by the foreigners?—I have brought some with me.

1385. Can you give an idea of the quantities of Monk Brand Sild, from Norway, that are bought?—That is usually bought for cribs, and is known to us as the crib sardine. From figures for the last two or three purchases, approximately, six cases of these are sold per week. Each case contains 100 tins. That makes 600 tins a week.

1386. Have you any idea from the purchases of the average meal of a man off this product?—I cannot say. It is mostly

purchased in dozen or half-dozen tins. I should say one of the larger tins of snacks would be eaten per meal.

1387. Can you find out for us the comparative numbers of each that are sold?—Yes.

1388. *By Mr. Gepp*—Do the foreigners generally buy the better or the cheaper lines?—Mostly the cheaper lines.

1389. Do they purchase very much vinegar?—Yes; they are large users of vinegar.

1390. How do they buy it?—By the half-gallon. We have it in kegs, and tap it for them.

1391. You know that a large number of foreigners have been here for some time, and have settled in their own homes, and there are also a large number who batch together or live in quarters. Do you notice any difference between the types of purchase of the married, settled man, and of the unmarried man?—There is a decided difference. The married man switches off tinned foods on to cheese and bacon.

1392. Do you mean that, as he becomes more acclimatised and used to the country, he tends to eat more of the food of the country, and less of the food of the country he came from?—That is so. That could be instanced in this way: The quantity of loose beans sold to single men is much greater than the quantity sold to married men. I refer to dried broad beans and dried lima beans. They are big users of them.

The witness withdrew.

The Commission adjourned.

Monday, May 11th, 1925, at 2.30 p.m.

[At Parliament House, Adelaide.]

Present—

Dr. K. R. Moore (Chairman).
Mr. H. W. Gepp.
Mr. J. L. Pearson.

BEDLINGTON HOWEL MORRIS, Inspector-General of Hospitals, Adelaide, and Medical Referee under the Workmen's Compensation Act, sworn and examined:

1393. *By the Chairman*—What was the date of your appointment as Medical Referee under the Workmen's Compensation Act?—About 1915.

1394. What is the mechanism of that position?—Briefly, in cases where an employer or employee is aggrieved by the action of a certifying medical practitioner in withholding or in giving a certificate, the matter is referred to me for final decision.

1395. In the course of your tenure of that position you have examined certain cases of plumbism?—Yes.

1396. Can you give us an approximate idea of the number of such cases from Port Pirie?—The total during the last two years was 10. I cannot go further back than that.

1397. Can you classify that series of cases as to types?—There were three appeals by the Broken Hill Associated Smelters and seven by workmen. Five appeals were dismissed, three upheld, and in regard to two decisions have not yet been made; they are *sub judice*. That makes six cases certified as lead poisoning, two not certified, and two cases still under observation by me.

1398. Those cases would be border-line cases in which the diagnosis was doubtful to ordinary methods?—Those in which the decision has been in the affirmative were to my mind unmistakable cases of plumbism.

1399. But the *prima facie* evidence of such cases would not point very conclusively to a diagnosis of plumbism?—Possibly not.

1400. Did the symptoms of these cases generally point to any particular type of case in the main or to varied types?—In the main, to similar types.

1401. What were the outstanding symptoms?—Anaemia, general health depression, in one or two cases early nephritis, a history of colic, and in one or two cases a history of neuritis.

1402. In all these cases have you had blood examinations made?—Yes.

1403. Was there basophilic degeneration in all cases?—In practically all cases.

1404. Did you receive from the pathologist a report dealing with the amount of haemoglobin and the red blood count in each case?—Yes.

1405. Can you give us an idea how they range?—About 70 per cent. haemoglobin. The red blood count varied, but in the last case there is very much increase in the white blood count. I do not place my diagnoses on blood tests, although they are of assistance.

1406. *By Mr. Gepp*—We have first to inquire into the cause of plumbism at Port Pirie. Can you, from your general knowledge of the conditions at Port Pirie make any comments thereon? We know from our reading, dealing with investigations made all over the world for a long time, that there are specific causes such as dust, fume, low resistance, which apply to all cases, and probably there are a certain number of causes which are specific to a particular place and industry. We have come across definitely two or three points. First, a large number of the cases reported are mild or sub-acute; secondly, the increase in the reported cases has been very great for the past year or so, and coincides with the increase in the number of foreigners employed. Can you give us any help or statistics on that matter?—I can give you my opinion. Lead poisoning is due to lead absorption into the system. This does not cause blood poisoning in a large percentage of cases. When the absorption is greater than the elimination by the excretory organs there is a balance in favor of lead poisoning, which is a cumulative poisoning in the system. That leads to the point that if the person who absorbs the lead is perfectly healthy in regard to his excretory organs he is less liable to suffer from lead poisoning. Lead is absorbed by three main channels, namely, the respiratory and alimentary channels, and by the skin. More particularly, however, lead is generally found in the naso-pharynx. If you have a perfectly sound healthy man both in regard to his organs and physique, and whose physical strength is not below par, he has a better chance, other things being equal, of resisting the onset of plumbism than a man in the opposite condition. With regard to foreigners, those I have examined, with one exception, have been men that I should class as being somewhat below par.

1407. You mean originally?—Probably, originally.

1408. *By Mr. Pearson*—I take it that in referring to foreigners you mean southern Europeans, as that is the way that the term has been applied in connection with the Commission's inquiry?—The men I have examined would, in the main, come within that category, although they include others. One of the exceptions was a Russian. He was a particularly healthy, robust man, but he suffered from lead. You get a greater incidence of plumbism among the Greek element. A point that has come to my notice is that, although the management of the smelters post up notices in seven languages, some of the men say they have not seen them. It may be, perhaps, that having seen them they were not able to grasp what they meant, and in consequence have not carried out the instructions. That may be another reason for the lead poisoning. Whereas the Britisher is told straight out to do certain things which a notice informs him he must do, and goes and does them, it is possible that foreigners might not understand the notice or see it, and, therefore do not obey the instructions.

1409. *By Mr. Gepp*—Possibly the foreigner cannot read?—That may be so. Further, speaking generally, in regard to the laws of personal hygiene, the class of men I have seen probably would not be so particular as a Britisher.

1410. All these points would have an effect would they not?—I should say they would have the greatest effect. Further, I understand, although I have not seen them personally, that the conditions under which some of these men are living are not in the best interests of their health. I am only speaking from hearsay, but I have seen one or two places which did not tend toward the best health of the people occupying them.

1411. In any industry in which a health hazard exists, from

your previous remarks it would appear that it would be wise to institute a very careful and systematic initial examination for all men entering the industry?—I should say so, not only in the interests of the men, but also the industry.

1412. Would you also support a periodic medical examination?—I think the men should submit themselves periodically. It is of the greatest importance in cases of lead to ascertain early whether they are absorbing it. It is of the greatest importance for the treatment of an employee afterwards, before his health is really undermined, that he should be seen and treated before the disease progresses very far. Of the cases I have seen some of them have become chronic, and it will take a long time to eliminate their symptoms.

1413. What you suggest is that by a more systematic periodic examination those cases that have become chronic could have been prevented?—Possibly. Take, for example, the case of defective teeth, which plays a very important part. Those things could be seen and remedied early.

1414. As part of the medical service which you agree is desirable with a big industry such as this is, you would include definitely a dental clinic?—I would.

1415. If you were in the position of the leading medical man in the service of the company you would arrange that the dentist and doctor would co-operate in all their work both in prevention and in cure?—Prevention, particularly.

1416. Does such a disease as pyorrhea and other manifestations of oral sepsis give somewhat similar signs and symptoms?—I should not say pyorrhea *per se*.

1417. Would it not give an anaemia of a similar type from the point of view of pallor and blood picture?—It would lower the general vitality of the patient, but I do not consider there would be much difficulty in distinguishing between the anaemia of plumbism and ordinary anaemia.

1418. Would you say that pyorrhea would predispose to plumbism?—Undoubtedly.

1419. If a man's mouth were in a bad condition he would be much more liable to plumbism?—Yes. His vitality would be lowered and, therefore, he would be less resistant.

1420. The evidence given at Port Pirie by the medical men indicated that a very large percentage of the men they had examined had a very bad condition of the mouth. Do your examinations confirm that?—I should not say that the 10 I examined were very bad, but their mouths were certainly not as good as they might have been. I am speaking relatively, because a bad condition of the mouth is almost universal, until attended to. I do not know that the condition of the mouths of these 10 men was worse than that of the average man following the same class of work.

1421. *By Mr. Pearson*—Their mouths were out of condition due to them not having been attended to?—They appeared to be so.

1422. *By Mr. Gepp*—From your general knowledge of health conditions in South Australia, could you give us any approximation as to the percentage of people who should receive dental attention. Would you say it was 80 per cent.?—Quite. As a matter of fact, I should say that a 100 per cent. of the people should visit a dentist periodically.

1423. Eighty per cent. do not?—I cannot answer that question.

1424. There is a general neglect of dental hygiene in Australia?—Yes.

1425. We should like to receive any suggestions from you in connection with the methods of reporting and refereeing cases of plumbism, in order to assist this Commission to get to the point mentioned in our reference, namely, the alleviation or prevention of this disease. For instance, are you satisfied that the present method of certification by one medical man and a reference to you as medical referee in the city is as satisfactory as it might be from the point of view of the results. Supposing you were instructed to make a recommendation as to the best method. Would you take it on the lines of Broken Hill with a body of three men specially charged with this work?—I think I have answered that to some extent in answer to another question, and that is that periodical examination of the men by competent examiners in regard to their health conditions would overcome that difficulty to a very great extent.

1426. *By Mr. Gepp*—That is dealing with inside the works?—Yes.

1427. Now we come to the certification which would justify a man, if he received a certificate, making a claim under the Workmen's Compensation Act either for weekly allowance or finally, at the end of six months, for full payment under the Act?—In doubtful cases you would always have some difficulty in getting a final decision.

1428. At Broken Hill they have a board of three—a medical board of reference and decision—one of which represents the men, another the company, and another the Government nominee in charge?—I do not think that would be good. I think the referee should be absolutely independent. He should be absolutely untrammelled or unbiased. His view will never please both parties. That system might work, but it does not appear to me to be a good judicial system.

1429. However good a single expert may be, three experts must be better, provided they are equally able. For the purpose of the Broken Hill Lead Poisoning Act there are three medical men appointed. These three men function together as one certifying body—certifying surgeon and medical referee together?—That sounds quite practicable. Whether it is better than the existing system I am not prepared to say. It appears to be a sort of consultation between three men. It does away with all the judicial effect of it.

1430. I suppose at Broken Hill the chairman would be the referee?—I am not prepared to say which is the better system. I have had no experience of the other.

1431. In receiving evidence from Dr. Tassie at Port Pirie the following were the question and reply:—

You informed us that one of your appointments was that of medical referee in connection with the Workmen's Compensation Act. In your opinion does the present scheme of certification under the Act operate to the best advantage of cases of plumbism?—Speaking as a general practitioner I do not consider that certification in its present form operates in the best interests of any one concerned. Especially do I refer to the certification of incapacity required for the purpose of redemption of weekly payments. I think that too great a responsibility is placed on the practitioner in this matter. He has to rely solely upon his own opinion and experience, and in the absence of any fixed standard upon which to work the estimates of the same cases of different practitioners must vary considerably.

Under the present circumstances the general practice at Port Pirie is to give a decision as to whether it is a case of plumbism?—The certifying medical practitioner is the man they have the trouble about generally. He either refuses to give a certificate, and does not satisfy one party, or gives it, and does not satisfy the other party. I understand there would be no certifying medical practitioner. What brings it under the notice of the board?

1432. A reference from the man's own medical attendant. Supposing a man goes to the doctor at Port Pirie. The doctor examines him, and sends him to the board. It seems to me that both the company and the man would have much more reason for definite satisfaction if that board of three definitely decided, unanimously or by majority, that it is or is not a case of plumbism?—It might work that way. I am certain that the three members would never be unanimous. One member's criteria of diagnosis would differ from the others.

1433. Supposing that, as the result of the work of this Commission, we can get a number of leading authorities on plumbism in this country, by discussion, to come to a definite statement to be embodied in the report of the Commission, giving the criteria in regard to plumbism, would that not be a big step in advance?—They would be taking upon themselves what no experts or authorities in the world are prepared to do.

1434. Does that mean that the diagnosis of plumbism is, in

essence, the opinion of individual men, taking into consideration all the signs and symptoms, and that they have no definite basis to go on?—Not in all cases. There are quite definite symptoms in unmistakable cases.

1435. We are trying to evolve some system whereby the dissatisfaction which exists at present on both sides can be eliminated?—There will always be dissatisfaction. You will never, by any process of examination, satisfy both sides. I think the Commission should direct their attention more particularly to the methods of preventing lead poisoning in Port Pirie. While the company has done something towards the elimination of lead poisoning, there is nothing in force which compels the employee to carry out any measures, such as the wearing of caps, washing the hands before eating, and so on, for the prevention of lead poisoning. In a white lead works with which I was connected in the old country, there were some strict regulations—the employees had to wear caps and wash their hands, &c. At Port Pirie there is no legal power to compel that. If I may say so, attention must be directed to the prevention of lead poisoning at the works.

1436. But you must have a criterion; you must get down to some method which will give as much satisfaction as possible in the way of diagnosis?—Well, if they will be satisfied with what you suggest I have no objection, but are you anticipating an increase in the dissatisfaction? Ten cases in the last two years does not seem to indicate a high percentage of dissatisfaction.

1437. You cannot take that as an indication of the dissatisfaction because of the expense and the trouble involved in sending men down, and of the doubt as to the result. From my point of view perhaps a secondary, but very important part, of this Commission's work is to recommend methods to relieve dissatisfaction in regard to the results of examination?—Undoubtedly.

1438. We have gathered some very interesting information regarding the extent to which the foreigners at the works live on tinned foods—tinned fish and so forth. Have you had any experience of the possibility of lead poisoning from eating tinned foods?—That is given as one of the causes—carelessly put up food and the acid in the solder coming in contact with the tin—but it is very remote. In the interior of Australia, Kalgoorlie, for instance, canned food was very much used, and I do not know that lead poisoning was very prevalent there.

1439. Would it be recognised?—I think so.

1440. Supposing an ordinary general practitioner in a country district had a case of lead poisoning, might he not diagnose it as gastritis?—No; it is an easy thing to diagnose an ordinary case of lead poisoning. It is an easy thing to prevent, and an easy thing to cure, providing it is not too far advanced.

1441. Would you say that it would be better for a man to live on fresh than canned foods if working at the smelters?—Undoubtedly, and at any time it is better, because fresh food is more nutritious.

1442. *By the Chairman*—Suppose minute quantities of lead are absorbed in eating tinned food, would you admit in the case of men already absorbing lead in the course of their work they might be sufficient to determine lead poisoning?—Oh, yes; but if you are going into those points you will have to go into the question of the water supply of Port Pirie smelters. In Great Britain cases of lead poisoning were proved to have come from reservoid water. Water that comes through peat releases an acid which affects lead pipes, and in Birmingham all lead pipes have to be glazed. What the water supply of Port Pirie is like I cannot say.

1443. We have been told that there is no indication of lead poisoning in the general population at Port Pirie?—Then that answers the point, and probably it is also an answer to the point raised in regard to the use of canned food.

1444. What would you say in regard to the abuse of alcohol?—It increases the liability to plumbism.

1445. And it affects other diseases, such as gout and syphilis, which are also a contributory cause of plumbism?—I should put it the other way round—lead is a cause of gout.

1446. *By Mr. Pearson*—Did I understand you to say that the examination of a person's blood was relied on to some extent in diagnosing lead poisoning?—As confirmatory only. You would not rely on a blood test alone for a diagnosis of plumbism.

1447. Do you think that a man who has once suffered from lead poisoning should be precluded from working in the smelting industry?—That would depend on the individual. If it could be shown that the man was of low power in general vitality, and was an unsuitable man to be employed at the works, he should not be re-employed; but, on the other hand, if a man contracted the disease through carelessness, such as the neglect of hygiene, I cannot see why he should not be re-employed. The evidence is that casual employees are more liable to the disease. In Germany one large firm made a practice of employing as many casuals as they could, in the belief that by continually having new men the incidence of plumbism would be reduced, but it was found to have the contrary effect, because the casuals did not try to protect themselves from the disease. A man who is permanently engaged is more careful.

1448. That brings in the question of the employment of south-eastern Europeans. Their lack of knowledge of English and consequent inability to understand the instructions given them is probably a contributory cause of their contracting the disease?—I have formed that opinion. I favor absolute power to enforce, not only the employer, but also the employee, to carry out proper precautions against lead poisoning.

1449. *By Mr. Pearson*—I have read that the greatest danger existed from dust. Would you confirm that?—Dust and fumes are great dangers, but I cannot say they are the greatest.

1450. *By the Chairman*—Would you care to make any further statement?—I am aware that much has been attempted by the company at Port Pirie in the nature of modifications and improvements in the smeltery plant and equipment, with a view to eliminating as far as possible noxious dust and fumes. I understand that better facilities for enabling the employees to carry out strict attention to personal cleanliness, &c., by the provision of lavatories, crib houses, &c., have been established. It is evident that the incidence of plumbism at the smelters is still high, and must be against the best interests of both employee and employer. I am of opinion that much good might result from the enactment of legislation making it obligatory on employees as well as employers to carry out in detail all precautions for the mitigation of this malady.

The witness withdrew.

EDWARD BROMLEY, Divisional Meteorologist, Adelaide, sworn and examined:

1451. *By the Chairman*—What is your position?—I am Divisional Meteorologist for the State of South Australia. The department here is a branch of the Commonwealth Meteorological Department, Melbourne.

1452. Can you give us any information regarding the prevailing winds at Port Pirie or in the area around Port Pirie?—In the short time at my disposal I have been able only to take out the prevailing direction of the wind as collected from the telegraphed reports sent every morning. They have a wind vane at the Port Pirie Post Office, which would give a fairly good indication. These figures are taken at a particular time only—8.30 a.m.—and, therefore, probably would not give full information. The wind vane is not similar with the one at the Observatory, and in strong winds may perform a circle, but during a strong wind you are able to gauge the direction by other means, such as by the feel of the wind on the face and by flags. Taking the three years, 1922, 1923, and 1924, which are the only years that Port Pirie has been a climatological station, the prevailing direction of the wind from December to April is from the south-east. From May to August the prevailing direction is from exactly the opposite quarter, namely,

the north-west. In September it is from the west, north-west again in October, and in November it is really variable, being partly from the south and north. Of course on quite a number of occasions conditions have been calm, but, taking the whole of the three years, the prevailing direction of the wind is from the north-west. It is curious that south-east and north-west are the two prominent wind directions at 8.30 a.m. Of course the wind in most cases would be light only, and as a matter of fact the calms are almost as frequent as the number of times the wind blew from the north-west. To give the prevailing direction of the wind throughout the day is not possible at present, although I should say it would be west to south-west. The tendency would be for the wind to blow off the sea, because of the difference in temperature between the water and the land. The south-easterly wind direction at Port Pirie rather surprised me, because the situation of Port Pirie in Spencer's Gulf is very similar to that of Adelaide in St. Vincent's Gulf, and the prevailing summer wind throughout the day in Adelaide is south-westerly. On winter mornings at 9 o'clock our prevailing wind direction is north-east, and I thought the same would apply at Port Pirie. There is an estuary at Port Pirie, however, and the Port Pirie Post Office is right up against it, and perhaps that is the explanation—the estuary causing a local wind. I should say that the wind at Port Pirie, particularly in the summer time, would swing round during the day to a westerly or south-westerly direction. At night it would then veer round and probably come off the land. During the day it would strengthen from a westerly quarter.

1453. Would the Flinders Range have any effect?—Yes. It would simply give a land breeze at night, but it would not affect the prevailing wind during the day. Generally speaking, at a place like Port Pirie, which heats up considerably during the summer, there would be a marked difference in temperature between Port Pirie and the gulf, which would result in a south-westerly wind.

1454. *By Mr. Gepp*—Are there any recording instruments for wind determination at the Adelaide Observatory?—Yes.

1455. Are they expensive?—I could not say what they cost. An anemometer simply recording the force of the wind might cost about £5.

1456. Would £50 cover an outfit to record the force and direction of the wind?—It depends on the type. I should say that for £50 you would be able to secure an anemometer for direction and force,

1457. Do the Government ever make arrangements with a big firm like the Broken Hill Associated Smelters to take records day and night, and forward them to you, or is that always done by the post office?—By the post office at present. As a matter of fact, outside of Adelaide we have no wind recording apparatus, with the exception simply of wind vanes.

1458. What would be the best way to arrange for the regular supply to you of data from Port Pirie over a period?—Could the Broken Hill Associated Smelters make definite arrangements with your department for the provision of instruments and the supplying of records to you so that the data would be always on record?—So far as the records supplied to us are concerned that would be all right, but who would procure the data.

1459. Supposing the management of the smelters undertook to do that work, and sent the records down regularly, would your department supply the instruments?—I could not say that. All supplies are determined from the central office. I doubt whether the Homes and Territories Department would supply expensive instruments like that.

1460. Would it not help your work if you had regular records at Port Pirie?—It would give definite information as to wind direction.

1461. It would be better for the company to write to you asking how arrangements can be made, and that could be referred by you to the central office?—Yes.

1462. Are there any records of humidity at Port Pirie—either for the town itself or the surrounding area?—I do not think so. They have a maximum and minimum thermometer, but not a wet bulb.

The witness withdrew.

The Commission adjourned.

Thursday, May 14th, at 2.15 p.m.

[At the State Government Bureau of Medical Inspection, Broken Hill, New South Wales.]

Present—

Dr. K. R. Moore (Chairman).
Mr. H. W. Gepp.
Mr. J. L. Pearson.
Mr. W. Robinette.

MALCOLM ROBERT FINLAYSON, medical officer-in-charge of the Bureau of Medical Inspection, New South Wales Department of Labor and Industry, Broken Hill, was sworn and examined:

1463. *By the Chairman*—What are your degrees?—M.B., Ch.M. (Sydney).

1464. When were you appointed to your present position?—On July 1st, 1922.

1465. Under what Act, if any, are you working?—I hold two appointments under two different Acts. I am Medical Authority under the Workmen's Compensation (Broken Hill) Act, 1920, and Chairman of the Medical Board constituted under the Workmen's Compensation (Lead Poisoning—Broken Hill) Act, 1922.

1466. Your work in this department brings you in contact with cases of plumbism, I understand. Can you give this Commission any statistics in regard to the number of cases you have seen, dealing with nationality of the patients, type of cases, and any further points which you think would be of assistance to us?—The board, since it commenced working in May, 1923, has seen 62 cases of lead poisoning. Of that number 44 had been previously certified by a medical referee as suffering from lead poisoning.

1467. Was that certification some time prior to the present illness which came under your notice?—They were receiving compensation. That leaves 18 new cases that have been diagnosed by the Medical Board. Of the 62 cases, six were foreigners, none of whom had been in the country for less than 13 years. One of them had been in Australia 38 years. Of the six foreigners referred to, two were Jugo-Slavs, two were Germans, one was an Italian, and one a Russian. Of the 62 cases, one is recorded as acute, four as sub-acute, and the remainder as chronic. The average number of years of exposure of all the cases is 24, and the average of exposure of the chronic cases 23 years.

1468. That is less than acute and sub-acute combined?—Yes. The 38 years brought up the average a bit. That man had been working here practically all his life. Dividing the cases into age groups, there was one man aged between 20 and 30 years, three between 30 and 40, 15 between 40 and 50, 17 between 50 and 60, 24 between 60 and under 70, and two aged 70 years or over. Of the first group, 20 and under 30, the average exposure was five years; the second group, eight years; the third group, 19¾ years; the fourth group, 24 years; the fifth group 28½ years; and the last group, 34½ years; giving a total average exposure of 24 years. In dividing the cases into exposure groups, I have divided them into exposure to lead at Broken Hill for under 10 years, exposure for over 10 and under 20 years, over 20 and under 30 years, over 30 and under 40 years, and over 40 years. There are four in the first of these groups, 15 in the second, 31 in the third, 11 in the fourth, and one in the fifth. Thus half the cases occur in the group over 20 and under 30 years.

1469. Taking the varying types of the disease you have met here, what were the outstanding symptoms complained of?—The board has dealt with very few cases that are not

chronic. The great majority are men who have had a long exposure, having been exposed to carbonate ores in their earlier days before sulphides were worked, and they now show chronic degenerations of varicus types, which are really taken by the board to be the sequelae of lead poisoning. The sub-acute cases and the acute case were all put under treatment, and completely recovered from the disease, returned to work, and have not since to the knowledge of the board had any further symptoms.

1470. Regarding the sub-acute cases, and the acute case also, I presume that they all complained of colic?—Four of them did. One did not.

1471. Did you find paresis in those cases?—We found no actual paresis in any of those sub-acute cases, nothing more than a general weakness.

1472. In regard to the chronic cases, were the majority of them of the cardio-vascular and renal type, showing evidence of chronic nephritis, &c.?—Yes, most of them were men who showed degeneration in the cardio-vascular and renal tracts.

1473. Did you frequently meet with palsies in that particular group?—Not in any great number. In some a history of palsy was given.

1474. Was there evidence in any considerable proportion of them of muscular weakness in specialised groups of muscles?—Only in very few.

1475. Were blood examinations made in all cases?—No. At the commencement they were taken, but we found that it was not a great deal of help in the chronic cases.

1476. Do you regard the blood picture as helpful in the diagnosis of a mild sub-acute case?—It can be taken as confirmation of other signs.

1477. We all know that certain cases of lead poisoning are unmistakable to all practitioners, but we are also inclined to the belief that certain cases would present difficulties of diagnosis which would lead in a great measure to the confusion of general practitioners outside the lead area. Could you give the Commission a statement of the criteria of diagnosis which would enable, perhaps, the formation of standards to diagnose lead poisoning?—In our work on the Medical Board we have not had much to do with the diagnosis of acute or sub-acute cases. I can outline some of the difficulties in dealing with chronic cases. Some of these cases, of course, present a great similarity to diseases due to other causes, and the only possible way a diagnosis can be made is to take fully into account the history of previous disease, exposure of the man to causes which may produce the complaint from which he is suffering, his present complaints, and signs found on a full clinical examination. Cases that we have seeen have been lengthy, men—as I said before—with a long exposure who have been previously affected by acute or sub-acute lead poisoning, and who since that time have been more or less continually exposed to the risk of lead poisoning. Where a man shows chronic degenerations such as are produced by chronic lead poisoning, and all other causes can be eliminated, the condition must, in the opinion of the board, be ascribed to the cause that has been operating, namely, exposure to lead. In those cases blood film examination is practically of little use. It has been necessary, of course, in some cases, to test the blood in other ways to ascertain if the condition is due to other diseases, such as syphilis.

1478. In these cases have you made haemoglobin estimates and red cell counts?—In a number of cases at the beginning of our work, about 20 cases, approximately, we did.

1479. In the sub-acute and acute cases you still consider that to be of value?—Yes.

1480. But not in the chronic cases?—No.

1481. In relation to the operation of the Acts under which you work, will you please give a short statement as to your functions and the functions of the board?—The Medical Board does the work in the Broken Hill district of certifying surgeon and medical referee in cases of lead poisoning. That is, under the Act any man who wishes to be compensated for any disablement by lead poisoning comes direct to the board, and the decision of the board is final. Previously the man had to go to a certifying surgeon, and the employer or the man could appeal against his decision, and apply to the medical referee to decide on the case. In Broken Hill, under the 1922 Act, lead poisoning is a notifiable disease. That is, if a man considers he is suffering from lead poisoning, or if a doctor considers one of his patients to be so suffering, the fact must be notified to the board. The three members of the board examine each case, and the decision of the board is given for the board under the signature of the chairman.

1482. Have you in your experience found this arrangement to work satisfactorily?—I think it is very much preferable to cases being dealt with by one man.

1483. You do not find that the board has any difficulty in any cases of coming to a unanimous decision or a just decision?—In my opinion, a just decision can be arrived at very much better by three men examining each case than by one man. An aspect of a case that may not obtrude itself to one man may become apparent to the other members of the board, and it is much easier to get from the man, and discuss thoroughly, all the points which help in making a just diagnosis.

1484. Is there any further statement you would care to make in relation to that part of the subject with which we are dealing, or any expression of opinion? The Commission is engaged in inquiring into all factors relating to lead poisoning at Port Pirie, and amongst other things the question of legislation has cropped up. We are anxious to obtain from all those who are in a position to speak on the subject opinions relating to the satisfactory working of legislation for the prevention of lead poisoning, and for the diagnosis and treatment of the disease?—It has been my experience, not only from reading but actual work in Broken Hill, that the incidence of lead poisoning depends entirely on the control of cases and working conditions. Anybody who has read much on the subject cannot help being impressed by the fact that modern methods of dealing with working conditions have decreased the amount of lead poisoning very considerably, and from the standpoint of the medical men it is very desirable that cases which are withdrawn from work should be kept under observation in order to see that they receive adequate treatment which will restore them to health, and enable them to return to work. It is the intention of the two Acts passed by the New South Wales Parliament that such control should be given to the board. Any man on compensation may be examined by the board at any time with a view to his receiving treatment. If, in the opinion of the board, he will be improved sufficiently to enable him to return to his former employment, it may order him to receive treatment either at his own expense or the expense of the company paying his compensation. The board must receive information as to the treatment he is receiving from the doctor who is treating the man, and it is able to review him at any time in order to see the effect the treatment is having. This has enabled a number of men to return to their employment. If, in the opinion of the board, a man shows susceptibility to the action of lead it can give him a certificate to that effect, and the company must pay a certain lump sum, which depends on his service on the Broken Hill Mines, to enable him to obtain work in a more suitable occupation. This, of course, does not apply very much to the Barrier at present, as few sub-acute cases are occurring here, but it appears to me to be an admirable way of dealing with lead poisoning cases.

1485. Can you give us an approximate idea of the number of men exposed to lead hazard at Broken Hill at present, including the number of men working in deep mines—because I presume there is still slight hazard there—and of surface workers in the mills?—The only figures I can give are that approximately 5,200 men are employed on the line of lode, all of whom are more or less exposed to absorption of lead.

1486. The number of cases you have examined—18 fresh cases in two years—is relatively small. On the question of

susceptibility, you have not in your series stated any case of lead poisoning without a history of less than some years of total exposure?—Of the sub-acute cases, one had been here four years.

1487. Was that the man's first appearance as a lead case?—Yes. Another of the sub-acute cases had been here four years, another nine years, and another 15 years. The one acute case had been affected after one year's work on the mines.

1488. Do you hold any view on the subject of relative susceptibility, apart from actual cases you have seen? Do you base any opinion upon variations in individual susceptibility?—I have had no experience of it, but from my reading I would say there is a certain type of individual who is susceptible to lead risk. Our experience shows that the development of chronic lead poisoning is affected by other conditions, when the man suffers from other chronic diseases or alcoholism. Strangely, we have found very little association of tuberculosis with lead poisoning here.

1489. Do you frequently find a history of alcoholism in connection with lead poisoning?—We have had very definite cases which we consider have been accelerated by alcoholism.

1490. In your opinion, does inter-current disease predispose to attack of lead poisoning where perhaps lead absorption with toleration has gone on for years?—Yes, I think so.

1491. *By Mr. Gepp*—Do you know of any work that has been done in the way of diagnosis through examination of the blood for lead as lead?—Yes, I have read some work on the subject.

1492. The authorities seem to agree, do they not, that preliminary action of lead is found to be typically and invariably, on the blood, setting up degenerative changes? If that is so, and if the lead is circulating, it should be possible, spectroscopically at least, to recognise the lead in the blood?—I would not express any opinion on that.

1493. You do not know of any work that has been done in that connection?—No, not in detail. The only thing I have got is determination of lead in the blood in *post-mortem* cases.

1493A. Has there been any definite indication of lead in the blood in these cases?—I did not receive any information from it that helped at all.

1494. If you could prove definitely that people not exposed to lead hazard never showed any lead in the blood qualitatively, and that people made susceptible to plumbism did show it, it would be of further assistance to other methods of examining the blood, would it not?—The question would be whether it would be of any further use than examination of the urine.

1495. *By Mr. Robinette*—Is it possible to detect lead in the urine?—Yes.

1496. *By Mr. Gepp*—You mentioned one acute case that had occurred in one year. Did that patient recover?—Yes, and returned to work.

1497. You mentioned to the Chairman that treatment is given in a number of cases by the man's medical attendant, and that the board is advised. Is that treatment general or specific to each case?—It is general treatment, as a rule.

1498. For plumbism?—To enable the man to eliminate any excess of lead that is causing his disability. With the exception of the acute case which I mentioned, we have seen most of our cases only in the sub-acute stage, and the treatment has been practically an attempt to eliminate lead and to raise the man's general resistance, so that the treatment is entirely general. No other specific treatment that has been found of any particular value has been reported to the board. One of the things done in practically all cases is to clean up the man's teeth. Many of them, like most workmen up here, suffer from a great deal of pyorrhea. By cleaning up their gums you can increase the efficiency of their gastric processes, and raise their general health.

1499. You mentioned that when a general practitioner considers that his patient is suffering from plumbism, the case is referred to the board. Does the doctor give a certificate for plumbism, or does he say to the patient, "I want the board to determine whether you have plumbism or not?"—There is a special certificate provided for in one Act. It says in effect that if a man has reasonable cause to consider that he is suffering from plumbism he must interview the board.

1500. Does the general practitioner say, "You have plumbism. I refer you to the board," or does he say, "I am not sure that you have not plumbism, and refer you to the Board?"—That is more or less to the effect. There is a special certificate under the regulations to the Act which has been supplied to all doctors.

1501. Would the man receive compensation on those certificates, or on one from the board?—It would be on a certificate from the board.

1502. *By Mr. Pearson*—The board is the only authority under the Act?—Yes. The notification to be given by the medical practitioner is shown in Form 9 under the regulations to the Workmen's Compensation (Lead Poisoning—Broken Hill) Act, 1922:—

Section 11.
Notification of Lead Poisoning.

To the Chairman, Medical Board, Broken Hill.

I hereby notify that person named hereunder is (*) *believed by me to be* suffering from lead poisoning:—

Name:
Address:
Place of employment:
Age:

(Signed)
(Address)
(Date)

This notification must be given by the medical practitioner attending such person, or by the person himself.

* Strike out, unnecessary.

1503. *By Mr. Gepp*—In regard to diseases predisposing to lead poisoning would this statement be correct:—"Diseases which lower the general resistance of the body tissues to the influence of lead, predispose to lead poisoning, anaemia, kidney disease, syphilis, alcoholism, gout, and inflammatory conditions of the mouth or digestive tract are particularly in point?"—Yes, I think they do.

1504. Might this, which is also quoted from Legge and Goadby's work, be regarded as correct according to experience under Australian conditions.—"People suffering from these disease may be regarded as in a non-tolerant class?"—That applies, as does practically all of Legge and Goadby's work, to acute and sub-acute cases.

1505. Would you consider it necessary to make a very strict preliminary examination in view of the conditions of working at lead smelters, so as to eliminate men who have such diseases as I have mentioned?—I certainly would.

1506. You think the examination should be very strict in regard to such industries?—I certainly think it should.

1507. What do you do in connection with the entrance examination asked for here?—Prior to the institution of the Bureau of Medical Inspection here, medical examinations were insisted upon by some of the mining companies, which employed their own medical officers to do the work. When the bureau was established it seemed more satisfactory to everybody that the work should be done by a man under the Government and in Government employ quite apart from either side. Therefore, all men who are employed at the Broken Hill mines are now examined at this bureau before they are taken into employment. They are examined by the medical officer in charge of the bureau.

1508. That is, examined by him in a different and distinct capacity from Chairman of the Medical Board?—Yes.

1509. With regard to the position at Port Pirie, could you tell us for our guidance what your work here involves in the way of time, in view of the possibility of the Commission recommending a similar organisation for Port Pirie, and in view of the fact that the Commission may or may not recommend one or two medical men, who possibly may be engaged by the smelter company, both for the supervision of the staff and men from the standpoint of general health and working conditions, and the prevention of plumbism. There are about

2,000 men employed?—In any place where acute lead poisoning is occurring in any degree, I am of the opinion that it is necessary to have periodical examinations of those engaged in the industry, for their own protection and the protection of the company.

1510. Assuming that the company has in its employ one or two medical men?—Much would depend on the daily average labor turnover.

1511. That is about 60 per cent. of the 2,000 men. If there were sufficient medical men on the works to do the internal work, those men could not also be in the capacity which you and your colleagues on the Broken Hill Medical Board are in?—No.

1512. It would not be right to have the company's medical men certifying under the Act?—No.

1513. If, again, a body of three were appointed for the purpose of certification, they could comprise either two local practitioners and a Government man, or three local men. If you eliminate from the duties of the chairman of such a board any work that could be done by the company's medical officer, and all the work that would be done by general practitioners in the town—and in that connection I would like to say the company's man would do no general treatment—would there be justification in the work remaining to be done for the appointment of a full-time Government medical officer at Port Pirie to do the work which you are doing in connection with the Medical Board only, because the company's man would probably do the examination work?—It would not justify the appointment of a full-time man. I understand you to mean a man who would occupy my position as Chairman of the Medical Board without any other of my work—work for the Joint Committee, and the making of examinations for entrance. The Medical Board does not at present take a great deal of my time.

1514. There would also be, of course, re-examinations from time to time of the considerable number of mild cases which are occurring at Port Pirie?—At present we meet as a board on an average only once a week for an hour and a half or two hours.

1515. From your experience, would you say it would be a definitely workable scheme to have, say, the leading, oldest, and most experienced medical practitioner in the district as chairman of the board, and two other men as members of a committee of three medical men, acting as a board?—I think it would be preferable to have as chairman a man who is not doing any general practice, if that is possible. That would be a very much better scheme than for a general practitioner, whose patients include staff and workmen, to have to take the position of chairman of the board.

1516. *By Mr. Robinette*—In other words, he should not umpire a case which he has possibly been treating?—That is so. His is really the final decision if there is disagreement between the other two members of the board. No doubt the scheme mentioned by Mr. Gepp would be workable in most cases, but there might arise cases where difficulty would be experienced, and it would be preferable to have in the chair a Government man who is not in general practice in the town.

1517. It might be arranged for the chairman to go up once a week or fortnight from Adelaide and go through the various cases?—Yes.

1518. *By the Chairman*—There are on an average nearly 20 cases a month at Port Pirie?—I think we can do on an average one case at a meeting of the board. All the pathological work and that sort of thing is done by me previously amongst my other work.

1519. Your experience here is with a number of chronic cases, whereas the experience at Port Pirie at the moment is with a considerable number of mild and sub-acute cases. In that connection what is the time taken to decide a single case by careful examination, would it be two hours in addition to the biological and pathological work prior to the examination?—I do not think it would take two hours. If you are doing blood examination it might take anything up to two hours, but I take it that that work would be done at a laboratory.

1520. You mentioned the cure of acute and sub-acute cases. Is it possible to give any length of treatment that is required for such cure?—They vary so much that it is impossible to state a particular time.

1521. Would you agree that the chairman of the board, if such a board were constituted at Port Pirie, would need to be an experienced man in regard to lead-poisoning cases previously?—It would certainly be advisable.

1522. You mentioned oral sepsis and pyorrhea. Is it your experience here that a great number of people suffer from defects of the mouth?—Yes, a large number.

1523. Would you consider it a good move to inaugurate a dental clinic in such works as the smelters at Port Pirie?—I think every man is the better for having his teeth attended to, and if he can get them well done cheaply it is certainly to his advantage. Most men do not look after their teeth and gums because they do not know the dangers that neglect involves.

1524. Statistics have been placed before the Commission showing a very large number of cases amongst foreigners at Port Pirie, who, in the great majority of cases are short service men. Have you had any experience which would indicate a greater susceptibility to plumbism on the part of foreigners?—I do not think our experience has been enough to warrant us in making any statement about the matter. It is only interesting that the one case of acute poisoning which we had was an Italian who had been in Broken Hill just under 12 months.

1525. Do you get a large number of cases of blue or Burtonian line amongst your cases here?—Very few. We rarely see them.

1526. Would it be correct to say that the blue line is rarely seen in the mouths of persons who pay attention to dental hygiene?—Not altogether. I have seen it in healthy gums.

1527. It is now believed that the blue line is not definite proof of lead poisoning, is it not?—Not of poisoning.

1528. *By Mr. Robinette*—It shows lead absorption?—Yes.

1529. Is it definite proof of lead at all?—I think that the blue line in gums is definite evidence of absorption of lead.

1530. *By the Chairman*—In the case of an acutely inflamed tooth socket, do you think you might get a purplish zone which might be mistaken for the Burtonian line?—Yes, one sees quite a lot of that.

1531. In that case, would it be easy to mistake it for the Burtonian line?—Yes, it is hard to differentiate in many cases.

1532. That might occur in a person not in contact with lead at all?—Yes.

1533. *By Mr. Gepp*—From your experience here, and as one having a general knowledge of the operations of big lead smelters, what is your view of the necessity or otherwise of full time medical men being attached to the staff in such organisations?—From my reading on the subject, it has proved of much value in such plants and works elsewhere.

1534. From your experience of the operation of the Act under which you are working, would you consider it advisable that statutory regulations should be passed in connection with such an industry as lead smelting, covering the health hazards and governing the actions of both the company and the men, for the prevention of disease?—I think so. They are covered by statutory regulations here.

1535. What is the board's notice under the Workmen's Compensation (Lead Poisoning—Broken Hill) Act, 1922?—It is found in form 11 in the schedule to the regulations, and is as follows:—

Warning Notice to Workmen.
Prevention of Poisoning by Lead.

All men working in or about this mine take dust containing lead into their bodies. Early medical treatment prevents permanent injury to health from this cause.

Men suspecting themselves to be affected in any degree by lead or suffering from persistent loss of appetite, constipation of the bowels, griping pains in the stomach, frequent nausea

and vomiting, headaches, weakness in the arms or legs, pallor of the skin, or a foul mouth and foeted breath, should present themselves to the Medical Board for medical inspection.

Compensation is payable for temporary disablement due to lead poisoning.

Failure to notify the Medical Board immediately as to the possible occurrence of lead poisoning may prevent a workman obtaining compensation.

The address of the Medical Board is Protestant Hall, Beryl Street, Broken Hill.

Hours from

Department of Labor and Industry, Sydney (date).

1536. *By Mr. Pearson*—I think you said the incidence of lead poisoning depended upon control of the working conditions. I take it that you mean by that the prevention of dust?—Yes; where dust is the hazard, as in most cases it is.

1537. You regard dust as the worst danger?—Absolutely.

1538. You have the right to determine that men are susceptible and exclude them from the industry, for which they are entitled to compensation. Is the compensation based on length of service or the possible length of disability?—The compensation of susceptibles who should not go to work amongst lead depends on whether they have done 10 years' work or under, or 20 years or under, &c.

1539. *By Mr. Robinette*—Supposing that a man had worked here only three months?—He would get £50.

1540. *By Mr. Pearson*—With regard to the chairman of a board on similar lines to your Medical Board, with local modifications, at Port Pirie, I understand you to say that your board is limited merely to the duties of a referee board, and that there would not be sufficient work for a full-time chairman. If the chairman of the board had to undertake the examination of all entrants, it would considerably increase his duties?—It would keep him very busy, I should think. My remarks about the first position not keeping him very busy would, of course, depend entirely on the number of cases to be dealt with. Here, if the men were to go to work among absorbable ores, I would probably require to have assistance.

1541. *By Mr. Robinette*—What percentage of the men examined for employment are rejected?—In the last 12-monthly period, ended June 30, 1924, it was 14.7 per cent.

1542. Has the percentage varied?—For the year ended June 30, 1923, it was 19 per cent.

1543. *By the Chairman*—What are the chief causes for rejection?—The great majority of the rejections are on account of respiratory, cardio-vascular, and renal abnormalities, owing to the special risk.

1544. Including silicosis?—Yes.

1545. That 14.7 per cent. would not include anyone who had worked previously in mines?—They may have worked before in a mine. Any man coming up here to work would have to go through that examination.

1546. There would be some percentage of silicosis among them?—Yes; but not much.

1547. *By Mr. Pearson*—Is there any arrangement whereby applicants for work in the mines may be examined elsewhere than at Broken Hill?—The bureau has representatives in Adelaide, Melbourne, Sydney, and Wallaroo.

1548. *By Mr. Gepp*—With regard to the 18 new cases of plumbism which you mentioned, are they definitely cases which have developed since the board has operated here, or are they possibly cases which were more or less tolerant, and have come on afterwards? Are they definitely cases of new arrivals and men not in the industry previously?—No; not any of them, with the exception of one acute case.

1549. Is it an indication of a slight, steady incidence at Broken Hill, or were they possibly a few cases just on the border line previously, which are now just coming out?—In most cases they are the culmination of years of employment.

1550. They are not definitely cases of lead poisoning which have been contracted *ab initio* during the last four or five years?—Three of them have occurred within the last four or five years, and the rest are old employees.

1551. The incidence of new cases is very small?—Yes.

1552. Our references are to enquire and report upon, firstly, the cause or causes of plumbism at Port Pirie; secondly, the increase in the number of reported cases; and, thirdly, what can be recommended with a view to eliminating or alleviating the disease. Can you make any other suggestions to the Commission from your knowledge, reading, and experience?—In my opinion what is most to be stressed is the importance of scientifically regulating the amount of dust to which the men are subjected in various working places.

1553. That would come as one of the items under statutory regulations?—Yes.

1554. Of course, medical supervision would cover the question of an entrance examination?—Yes.

The witness withdrew.

The Commission adjourned.

Thursday, May 21st, 1925, at 11 a.m.

[At Lewis Berger & Sons' Works, Rhodes, New South Wales.]

Present—

Dr. K. R. Moore (Chairman).

Mr. H. W. Gepp.

Mr. J. L. Pearson.

LESLIE HALSE ROGERS, medical practitioner, Ryde, New South Wales, was sworn and examined:

1555. *By the Chairman*—Will you explain your appointment with Lewis Berger & Sons (Australia) Ltd.?—Some seven or eight years ago the firm decided to erect a factory here and commence the manufacture of white lead, paint, and varnish. The directors from the outset recognised that the work their men would be called upon to do was possibly injurious to health, and they set out to guard against the dangers in every way possible. The buildings were designed to give maximum light and air, and machinery of newest design and protected character was installed. The general factory conditions were made absolutely up to date as to hygiene. Regular medical examination of all employees was decided upon, and I was appointed medical officer.

1556. You have a statement to make covering your duties and experience?—Yes. Up to the present the results have been most satisfactory and gratifying, only three or four cases of plumbism having been reported. Upwards of 40 men have been employed in the corroding of lead, 40 in paint manufacture, and 10 in the varnish department, making in all about 100. The cases reported have all been among those engaged in the corroding sheds. Each employee is provided with a locker for clothes, bags, and personal effects. Wash-basins and showers, with hot and cold water, soap, nail-brushes, and towel are also provided. Employees are given two changes of overalls per week. Each man is instructed to change into overalls before commencing work and to change and wash thoroughly before leaving, time being allowed for this; not to wear home any clothing soiled with paint or lead, and to be especially careful to wash the hands before taking food; to take regular aperients, and drink plenty of milk. Smoking while working is prohibited. Printed notices are posted in various departments setting out the dangers of lead poisoning, how this may be acquired, and how best to guard against it. The men engaged in rooms where dust is likely to be present are provided with mask respirators and instructed to wear them. Vacuum dust-collectors are installed where dry lead is being packed. Medical examination is made regularly once a week. Visits are also made when any complaint is reported or any accident occurs. Inspection consists in personally observing each man, examination of mouth, teeth and gums, hands, and finger nails. If any have complaints they are again seen separately and thoroughly examined system by system. Where lead infection is suspected blood and urine examination is undertaken. Each man's history is taken and the record kept by means of a card system. The employees at first were somewhat reluctant to present themselves for examination, and some resented it, but on finding it was to be insisted upon and was for their

protection and benefit, soon fell in with the employers' wishes. The experience gained after several years has shown that these men, although admittedly exposed to health risks, are better conditioned and more hygienic than the average. Many men on being engaged have presented themselves dirty in appearance and evidently dirty in habits. Many have had mouths full of filthy and decayed teeth. These have been attended to, and in a few months the change made has greatly improved their general condition and appearance. Experience also teaches that medical examination before engagement in this occupation is desirable. Previous history can be ascertained, general conditions noted, and a very good idea of fitness reported. In some men cleanliness is among the traits undeveloped and unattainable. These men should be rejected. The men engaged in the corroding sheds are given turn about with the dirtiest and most dangerous jobs—drawing, no doubt, being the task most likely to cause infection. Several men have shown evidence of lead absorption, such as blue line on the gums. They have been removed for a time from contact and given, when possible, work in open yards, even though they have not complained of indisposition. Others have absented themselves for minor ailments which, without just cause, are sometimes attributed to lead. No case of plumbism has been reported during the last two years. The average absence through sickness during the last year, in days, per man was:—Paint department, 1 day; white lead department, .8056 of a day; varnish department, .4073 of a day. Four cases only of definite plumbism have occurred. The first was soon after the work commenced. A foreman in the corroding shed became leaded. He had severe colic and obstinate constipation, slight blue line being also present. After an absence of a few weeks this man returned and has since shown no signs of recurrence. In this case the source of infection was probably inhalation of dust from dry white lead, the employee having admitted that he cleaned out several drying pans without wearing a mask and respirator as he had been instructed to do. The second case occurred two years later in an employee engaged in the corroding shed. This man had been working turn about setting and drawing practically from the start of the work. He complained of backache and general weakness and debility. Some abdominal pain followed, with lightning pains in lower extremities, slight wrist drop, and wasting of muscles of forearms (extensors and small muscles of hand). Urine examination showed no lead, blood picture no pasophilia, haemoglobin high value, no blue line on gums. This patient was very afraid, and convalescence was prolonged. On returning he was employed in open yard for a time, and later returned to corroding shed. He has since been working for upwards of two years with no recurrence. The third case was in a man also engaged in the corroding shed, but this man had been working for a few weeks only when he showed signs of lead poisoning. He was anaemic, had a blue line on gums, and had attacks of severe colic. He also complained of exceedingly bad taste in his mouth. He had no headaches or sign of encephalopathy and no sign of paralysis or paresis. He received treatment, and after an absence of three weeks returned to work. He had no recurrence, but was afraid, and decided to change his occupation. A fourth case was one reported from private consultation as plumbism, but in regard to which I think the diagnosis was very doubtful. This man had been working, setting, and drawing for two or three years. He had previously absented himself for an acute attack of abdominal pain, which was then diagnosed as lead poisoning, but which on careful investigation proved to be ptomaine. On this second occasion the man complained of severe backache and weakness in legs and feet. He had no colic, no sleeplessness, and bowels well open. He had anaemia and legs very thin and muscles poorly developed, no extensor paresis, and blue line. Blood picture was normal, and there was no blood in urine. This man recovered and returned to work, and has improved in general condition. Many of the men at the works have been at the same job for years, some feeding the lead kettle exposed to fumes, others handling pig lead, others again handling and packing dry white lead. The majority of these show no sign of lead absorption or lead poisoning. No doubt they have developed a gradual tolerance to lead absorption. The men engaged in the varnish department and in the paint mixing have been exposed to turpentine fumes, but not any have developed an attack of so-called "painters' colic," which by some writers is attributable to turpentine and not to lead. There is no doubt that industrial hygiene as aimed at and carried out by co-operation between employers and employees in this instance is the determining factor in the possibility of such a favorable report being presented.

1557. You mentioned in regard to certain men showing signs of lead absopption such as blue line in the gums, that they were removed from lead work for a time. Do I understand that they returned to that at a later date?—Yes.

1558. Did the blue line disappear?—Yes.

1559. Approximately how long would it take for the blue line to disappear when men were removed from lead hazard?—I could not say exactly, but in most instances is was visible for only two or three weeks.

1560. There was no impairment of the man's general health associated with that blue line?—No.

1561. What type of respirators are in use at the works here?—The mask respirator (with a moistened sponge) fitted over the nose and mouth.

1562. Your duties in connection with this establishment do not occupy your full time?—No.

1563. Could you give the Commission an idea of the arrangement you have with the company?—An inspection is made regularly every week at practically the same time on Wednesday afternoon. The time occupied varies according to circumstances. I go right round among the men employed in the different departments, and if there are any complaints made I bring the men over to the administration block and examine them individually. The weekly inspection might last an hour or two hours more or less.

1564. You make individual examinations when necessary?—Yes.

1565. *By Mr. Pearson*—The ordinary examination is just a general examination, with the men passing before you?—Yes.

1566. In connection with the examination have you some form of records?—A card system tally is kept in the office.

1567. With regard to lead poisoning generally, do you consider dust the most likely source?—Yes, the inhalation of dry lead in the form of dust is the most likely form of infection.

1568. You referred to personal cleanliness and said men who gave no evidence of it were not suitable for employment in an industry like this?—Yes; I said it would be desirable to have a look at a man about to be employed and form an idea of his general habits and condition.

1569. There are many south-eastern Europeans employed at the Port Pirie Smelters. Have you had any experience with that class of labor?—No.

1570. A low standard of living would make men more susceptible?—I should say such men would be more likely to become affected. The question is where they could be made to take precautionary measures.

1571. *By Mr. Gepp*—Our references from the South Australian Government are to enquire into and report upon the causes of plumbism, the increase in the number of reported cases at the Port Pirie Smelters during the past two or three years, and what steps may be recommended for prevention or alleviation. As far as we have gone the position has developed to this extent: The number of reported cases has increased from practically none five years ago to several hundred last year, out of an aggregate of between 1,500 and 1,600 employees. While the provisions of the Workmen's Compensation Act, in regard to lead poisoning came into operation on January 1st, 1912, they were not realised by the men until about 1917, or at any rate no applications were made under that Act. Whether or not there were cases we have at the moment very little proof, except that in 1910 an enquiry by Dr. Ramsay Smith gave an indication of a certain number of cases occurring in

previous years, which he thought would be greatly reduced as a result of improvements the company were putting in for the removal of fumes, etc. Undoubtedly an improvement did take place in the health of men employed at the blast furnaces or thereby, but since 1913 the applications for compensation have increased very rapidly. During the past few years the number of employees of the Mediterranean-European type has increased from one to every eight Britishers to one to every two Britishers. In your statement you mentioned an entrance examination?—Yes, I said experience also teaches that a medical examination before engagement in this occupation is desirable. A man's previous history is important. He may have been leaded somewhere else before coming here and it would not be fair for that man, after a few weeks to be reported as having been leaded at this establishment. He might be a stone mason who has had silicosis.

1572. The preliminary medical examination is done by yourself?—Yes; we have not carried that out absolutely. All men who have been taken on have not been examined by me before starting, and that is why I put it in. If they had been so examined I do not think one or two would have become leaded who did so.

1573. From the experience you have gained do you strongly recommend for an industry dealing with lead the necessity for a thorough medical entrance examination?—Yes.

1574. What is your experience both here and in general practice in this district regarding the condition of the teeth of the people?—In a good percentage of working men the teeth are in a bad condition.

1575. If it were possible to arrange for sound and good treatment by the institution in large works, such as the Port Pirie smelters, of a dental clinic, do you think it would be a definite help towards general health?—Yes; towards general health as well as against susceptibility to lead poisoning.

1576. Oral sepsis generally would tend towards anaemia?—Yes.

1577. Would that anaemia give a blood picture which would in any way compare with lead?—Not necessarily.

1578. Would it be possible from your experience to differentiate between cases of anaemia due, say, to pyorrhoea, and that due to lead?—In definite lead poisoning you get an increase in some of the different types of cells, called basophilia, and when that was noted as occurring it is more or less evidence of lead poisoning, but I would not say that because a man had basophilia he had lead poisoning, though if he had lead poisoning he would probably have basophilia.

1579. *By the Chairman*—You would not expect to find a case of basophilic degeneration due to pyorrhoea?—No.

1580. *By Mr. Gepp*—The average number of days of absence through sickness amongst members of friendly societies is shown by a recent report of the Federal Commission on National Insurance as about 10 to 15, according to the State. Do I understand you correctly to say the days of absence amongst employees at these works is less than one per annum?—That is during the last 12 months. I asked for the statistics, and that is the report.

1581. In some industries there is an arrangement for sick and benefit funds, which have tended to increase the time lost per man. Is there such an arrangement here?—No; unless it is some accident or sickness in connection with the business.

1582. Is examination of the urine done here systematically among the employees?—No; it has been done in the cases I have reported. If it had to be done systematically mine would be a full-time job.

1583. In some cases where you get past a certain absorption point in lead it does show in the urine, but obviously it has not been necessary here and so has not been done?—Quite so.

1584. With regard to the abuse of alcohol and its effect on workers among lead, did any of your cases of lead poisoning occur in men inclined to over-indulge in alcohol?—I could not say that.

1585. We are not yet completely certain that all the reported cases at Port Pirie are plumbism, as there is such a large percentage of mild cases, which are certified to by one man, a general practitioner. It is possible that there may be other causes. Have you any experience of the possibility of other diseases giving the symptoms of early plumbism?—There are definite symptoms and signs of lead poisoning, but some other diseases, such as anaemia, give those signs.

1586. Have you had any experience of carbon-monoxide poisoning in your general practice?—Only in suicidal cases.

1587. Not in industrial cases?—No.

The witness withdrew.

CLARENCE MENSLEY TAYLOR, assistant to the directors of Lewis Berger & Sons (Aust.) Ltd., Rhodes, New South Wales, was sworn and examined:

1588. *By Mr. Gepp*—What are the products made at these works?—White lead, both in oil and dry, paints, and varnishes.

1589. In the production of white lead which operation do you regard as the most hazardous?—There are two really—the emptying of the stacks, which we call drawing, and the packing of the dry white lead.

1590. How many men on an average are employed on those two operations?—Twelve in drawing from the stack, one in drawing lead from the pan, and two in packing dry lead.

1591. Are those men employed regularly, or are they changed around into other occupations?—They change around. The men engaged on drawing in the shed are only on for alternate weeks, the man drawing from the pan gets only about one week in three at that work, and the men packing dry lead about the same.

1592. Do you draw men from other operations in the works for those particular jobs?—It is the same range of men all the time.

1593. In regard to the precautions you have adopted since the beginning of your manufacture here, have you found the organisation function satisfactorily?—Yes.

1594. Have there been any objections from the men to the precautions and restrictions necessary in order to protect them?—Not that I recall. We occasionally had men who would not conform to what they disliked doing, but if they were persistent in their slackness we got rid of them.

1595. That is, you have maintained discipline as a necessary part of the job?—Yes.

1596. Have the American "H. S. Cover" respirators, a sample of which you put in as evidence (Exhibit 17) been used from the beginning?—Yes.

1597. Have you found them satisfactory?—As far as I have been able to judge.

1598. You have not found it necessary from results to make any experiments regarding other methods?—I do not think we would be justified in abandoning that type.

1599. What do they cost approximately?—About 11s. 6d.

1600. Is each man supplied with an individual respirator?—Yes; and he keeps it usually in his locker. When necessary he is supplied with a fresh one. All the men in the works do not have respirators.

1601. They are supplied to all men carrying out operations where you consider they should be used?—They are supplied for all operations with lead where it is likely to be in a free form.

1602. The use of them there is compulsory?—Yes; we had difficulty in the first place. They used to get mixed up.

1603. The utilisation and cleanliness of respirators is an essential condition of employment?—Yes; and each man is responsible for his own mask.

1604. Have you found medical supervision in the works to be a definite advantage?—Yes; absolutely.

1605. Have your methods of exhaustingg dust to the bag houses been fully satisfactory?—I believe so.

1606. Is it a definitely practicable scheme to carry out work of that sort in an industry like this?—I am of the opinion that the results prove that here.

1607. Could you give us briefly the story of your statistics concerning absences from work due to various causes?—I have

some statistics compiled quite independently from those of the doctor. Although compiled two years ago they would be true now, as they were taken over a period of four years, and the results were approximately similar for each period. The average worked out from them shows in the case of men in the corroding shed and lead mill the average loss of time from all causes was identical—.97 of an hour per week, which is equivalent to about eight days a year.

1608. Is that for sickness or football matches and so on?—It is loss of time from any cause whatever. At the time I took out the absences due to occupational illness or accident, and they ran out for the lead mill at .4 of an hour per man per week, or 7.4 hours per year, and only about a fourth of that for the shed men.

1609. Does your figure of approximately eight days a year include absences due not to sickness, but to other reasons, such as the death of a mythical grandmother?—That eight days a year is the maximum figure, and includes both sickness and other absences. When a man is away for a day or two we never inquire the reason unless it is something connected with the works.

1610. There would be nothing to show what percentage of those absences was caused by illness of any kind?—Without knowing I should say 75 per cent. would be due to illness. The men stick pretty closely to their work. We have never been troubled by men getting on the spree and losing time in that way. Apart from a day or half a day which men may take off for some domestic reason the absences are few. A man, for instance, may be laid up with influenza or something like that.

1611. Apart from the few cases of plumbism mentioned by Dr. Rogers, have you noticed any other industrial disease in the works?—None whatever.

1612. Could you let us have a copy of the printed instructions issued to your employees?—Yes; I put in the instructions we have had displayed since 1917 over the signature of Mr. Sullivan, our works manager (Exhibit 18), and hints on the prevention of lead poisoning received at a later date from the Department of Public Health, Sydney (Exhibit 19). I also put in the current award of the New South Wales Industrial Court relating to the wages and conditions of employees in the industry of making paint, varnish, and white lead (Exhibit 20).

1613. What are the hours of work?—In the lead and paint mills nominally 44, but less than that actually.

1614. What are the main rules which employees in the lead works must obey in regard, firstly, to personal hygiene; secondly, clothing; and thirdly, respirators; such things as you consider are connected with the prevention of any industrial disease?—We have an employment bureau for the enrolment of applicants. If a man is wanted for the lead mill or any other portion of the works an application is made to the bureau, where an applicant is selected. The bureau officer has noted on a card some personal details of the applicant, and his judgment dictates the man he will choose for a particular job.

1615. Is that officer one of your permanent staff?—Yes; a man from the head office.

1616. Does he do anything else in regard to industrial organisation?—No; he is really an employment registrar. Having selected a man his recommendation goes to the works superintendent, who either approves or disapproves it. If the selection is approved the man comes in. Occasionally we have had men sent to Dr. Rogers first for examination, but not often. We have accepted the selection as being good enough. In any case the doctor will be at the works on the Wednesday of every week, and a man cannot be here very long before he is looked over. A man whose personal habits look to be unclean would never be selected for approval. Having been engaged, the man is provided with overalls, which he is compelled to wear, and they must be changed twice in five days.

1617. Who provides the overalls?—The company, which also keeps them in repair, and has them washed. The man does nothing but don them and take them off.

1618. Does he change his underclothing before commencing work?—That rests entirely with the men. Some do and some do not.

1619. Is bathing compulsory?—It is, but is often honored in the breach, though we allow time in which to do it—15 minutes in general, and 30 minutes in special cases. The corroding shed men are in the latter category. They always cease work before the rest of the employees—half an hour before sometimes, and they are paid for that time.

1620. Supposing the work was a little bit behind and you wanted to get certain stacks finished, so that the men had to bathe after hours if they cared to do so; would you pay ordinary time or overtime for that?—The men are paid up to the time at which they cease work. If they are a quarter of an hour later than other branches a proper amount of time, after actually knocking off, sufficient to enable them to have a bath, is allowed for.

1621. *By Mr. Pearson*—In other words, that allowance is always made?—Yes.

1622. *By Mr. Gepp*—Do you find the wear and tear on overalls heavy? How long do they last?—Much depends on whether a man plays football during his lunch time. The life of overalls is not very long, usually less than six months.

1623. With a comparatively small working force, I presume that you are able to choose a high class of men for the special jobs, so that on an average the men treat the company's property in that way with a reasonable amount of respect?—The average man does. A good proportion of our men are bearing on to middle age, especially those in the corroding shed and lead mill. No one under the age of 21 years is employed there. The majority of the men in those branches have been with us since the plant started about eight years ago.

1624. What is your basic wage?—For lead employees, £4 8s. 6d. for week of 44 hours; and in the paint department, £4 6s.

1625. How are those rates fixed?—Last time by agreement, which was confirmed by the State Industrial Court.

1626. Are there special rates for special jobs over and above the £4 8s. 6d.?—Yes, that is the minimum. The remuneration goes up to £5 3s.

1627. What is the highest paid job?—That dealing with the dry lead in the stacks and grinding.

1628. That difference is paid by agreement in recognition of a certain industrial hazard?—Yes, and, of course, some of it is harder work, and some calls for more skill.

1629. Would you say any part of the extra pay is due to industrial hazard?—Undoubtedly that has something to do with it, but I do not think that point was discussed when the agreement was being framed. The whole aspect of the matter was considered.

1630. Do the men employed in the stacks work on some task basis, that is to say a certain number of men get through a certain amount in a certain number of hours?—We expect them to do so, and it is an honorable agreement that they should. The men contended that they could do just as much work in 44 hours as in 48, and we said, "If you give us your word, you can do that." Most of the men were willing to give 44 hours a trial. They undertook to do so, and they live pretty well up to it.

1631. In regard to compensation, are you working under the Workmen's Compensation Act?—Yes.

1632. In the matter of the very few cases of plumbism you have had, do you come under special clauses of that Act?—The men under the Act are entitled to two-thirds of their weekly wage for the period they are absent. We have always paid them the full rate when suffering from occupational illness, and have recovered only two-thirds from the insurance company.

1633. Have you had any cases where in the interests both of the men and yourselves you have felt it necessary to refuse re-employment, or have you been able to put such men into some other job?—We have always changed their positions. In one instance the man was made a lift driver, and in another he was not asked to work in any place where there was a possibility of lead dust being present.

1634. After having inspected your processes and methods, am I correct in saying that the steps you have taken have

been towards the prevention of dust as your main effort to keep down the incidence of plumbism to a minimum?—Yes, that is the main effort we have made, both by the installation of dust collectors in the stacks, and dust collectors throughout the buildings.

1635. The second step is personal hygiene and the provision of overalls to prevent clothes carrying dust away after working hours?—Yes, medical inspection also, and the insistence of the doctor on men having bad teeth attended to.

1636. You regard the condition of the mouth as being especially important?—The doctor always lays stress upon it, and we recognise his authority and opinion in the matter.

1637. Have your change houses, which are excellently laid out, been available since the beginning of operations here?—Yes, they have been enlarged since the beginning.

1638. Is there any regulation regarding the washing of hands preparatory to the mid-day meal?—There is no regulation, but the men are given from three to five minutes in which to wash. It is understood that they must wash before going into the dining room or partaking of meals. Hot water and soap are provided, each man has a towel and nail brush, and each departmental foreman is reponsible for his men keeping clean.

1639. With regard to health regulations, are there any conditions or restrictions under the State laws applying to works of this kind?—The only obligatory thing I call to mind is the quarter of an hour for bathing at the end of the day. That is under the arbitration award under which the men work. We not only conform to that, but give them more. The regulations which are observed were framed by the company for protection of the health of the employees, and while originally based on English legislation have been improved beyond that.

1640. The only State regulations you observe are conditions imposed by regulation in the Arbitration Court?—Yes.

1641. *By Mr. Gepp*—But those are in excess of the statutory regulations of other countries?—Yes. The only other regulations with which we have to conform are those of the Factories Act in regard to fire risk, machinery, &c.

1642. *By Mr. Pearson*—Do the men change their boots as well as don overalls?—Yes, uniformly they wear old boots without socks.

1643. In the preparation of the health notices issued by the company, had you the assistance of your medical superintendent?—They were framed by Mr. Sullivan, the works manager, based on English and American regulations for white lead works.

The witness withdrew.

The Commission adjourned.

Thursday, May 21st, 1925, at 2.30 p.m.

[At the Works of the British Australian Lead Manufacturers Proprietary, Ltd., Cabarita, N.S.W.]

Present—

Dr. K. R. Moore (Chairman).
Mr. H. W. Gepp.
Mr. J. L. Pearson.

THOMAS WILLIAM FREEMAN, medical practitioner, Concord, N.S.W., was sworn and examined:

1644. *By the Chairman*—You are the medical officer attached to the British Australian Lead Manufacturers Proprietary?—Yes.

1645. What was the date of your appointment?—I commenced in July, 1921, when white lead was first produced at these works.

1646. Will you relate your experience as medical officer of the company touching also on the question of lead hazard in the processes and giving any other statement which you think will be helpful to this Commission in its inquiry concerning the lead posoning which exists at Port Pirie?—First, as to precautionary measures, the men have overalls which are changed every day. The men emptying the stacks may change theirs twice a day if necessary. We prohibit smoking in the works. The men engaged in the removal of white lead from the stacks wear masks. Our idea is to keep the process wet; that is to say, any white lead is kept wet as much as possible. For that purpose we have a hose fixed at the end of the stack which is being opened so that the content is thoroughly watered before it is distributed at all. The hose is supposed to be kept playing the whole time the stack is being emptied. In the factory there is one man employed entirely for cleaning purposes. Both floors of the factory are washed down twice a day. The lower floor is hosed. In between times this man is walking about the factory with a damp rag wiping down the rails or any woodwork where there is any liklihood of dust settling. As to the men themselves, they are given ten minutes before lunch and before knocking off time especially for cleaning themselves up. In addition we have an occasional inspection of hands by the foreman before the men go to lunch in order to see that they wash themselves thoroughly. There are always a few men who haven't done so, and they have to go back and wash again. As an extra precaution we move the men around to a different process every fortnight or three weeks. Thus a man is not permanently in the stacks where white lead is, but goes into the stacks where bulk lead is being put in or is moved into the packing-room. In addition, we have the usual aperients which they can take, and on occasions where we think it necessary we make them take also an iron aperient mixture if they are off color. These are supplied by the factory. When a man who has been away from work on account of lead is well enough to come back he is given an outside job.

1647. What aperient do you mainly use?—Whitehouse mixture. The iron aperient mixture contains two grains of ferri-sulphate and half a drachm of magnesium-sulphate.

1648. Is washing made compulsory before mealtime?—Yes, ten minutes is definitely given out of factory time for that alone, also before the men go home at night.

1649. Is bathing under showers optional?—Yes.

1650. Do the men use the shower-baths to any great extent?—Yes, very largely.

1651. Will you proceed to deal with cases of lead poisoning which have come under your notice, mainly from a statistical point of view?—In six months in 1921, that is, from July until December, we had two definite cases, both characterised by colic. One cleared up well. The other man I lost trace of, but as far as I know he is all right. Another man developed abdominal pains, and I diagnosed his trouble as chronic appendicitis. He went to a hospital and was told that he had lead poisoning, but after that he went to the metropolitan certifier, who said he had not got lead poisoning. Another man was in the works for three weeks and spent alternate days actually in the factory. He became ill, with vomiting and various other symptoms which I did not for a moment consider to have been due to lead poisoning, though I believe he was certified later as suffering from it. That man could not have been in the factory more than nine alternate days. As a matter of fact, he was a heavy drinker. In 1922 up to September there were four definite cases of plumbism and one query; that is to say, a man had pains in the stomach and back, and was off work for three days, but he has never had symptoms since. From that September there were no cases in the same year, and in 1923 none at all. We went through 1924 until March 30 without a case, then had a man who developed a lead colic. At the same time he had an acute attack of influenza, which was followed in about a week by quinsy. He had a pretty big dose of it altogether. On May 13, 1924, I felt reasonably certain that he was free from any symptoms of lead and that he was fit for light work. He said he was not. I held a consultation with Dr. S. A. Smith, of Macquarie Street, who agreed with me that he did not show any definite signs of lead, but suggested that he should be given another three weeks off work, when, in his opinion, it would be possible to regard the man quite free from symptoms, and that he would recover without disability or any damage

to his health. That was Dr. Smith's statement in a certificate. At the end of the three weeks the man said he was still not well enough to come back to work. Later on we heard he had been admitted to a hospital suffering from lead poisoning. We got into touch with Dr. Smith, who looked up the hospital record and found that he had been in the hospital suffering mainly from neurasthenia and tonsilitis. However, the urine contained a trace of lead. Dr. Smith's statement now was. "That there was no permanent damage from lead, since he was not anaemic, nor was there any kidney disease present." He also stated that the urine should be free from lead in about one month. That is the last we heard of the man, except that I believe he is still drawing compensation. The next case was on February 16 this year. This man had a wrist drop. The wrist drop having cleared up, the man felt quite well, and we put him back to work on March 24th in the packing-room, where we thought there would be small chance of him getting a recurrence. In the meantime he had put on half a stone in weight, which was very much against a severe toxaemia from lead. Later on he went off work again, complaining of numbness in the left arm and in the side of the head. He is still away from work, although he is able to play the drum in a local band.

1652. That is nine cases in all?—Yes, in practically four years.

1653. The bulk of those occurred in the first year or eighteen months after commencing white lead operations?—In the first fifteen months.

1654. Have you details of the position these men occupied in the works?—Most of the original cases worked at the crushing plant, which has since been altered.

1655. *By Mr. Gepp*—Was that a wet operation?—There was a lot of splashing. The two cases we have had since then worked all over the factory.

1656. *By the Chairman*—Were they men of comparatively long service?—One was over a year, probably eighteen months, and the other had been there some three years.

1657. To your knowledge did any of those earlier cases present an industrial history which indicated that they had been employed in lead operations prior to coming here?—No, they had not.

1658. Have you any idea of the average duration of work here, especially in relation to that crushing operation, necessary to bring about symptoms of lead poisoning in those men?—The first two were here two or three months.

1659. That would indicate that the dose of lead they were receiving was comparatively large?—Yes.

1660. Did the cases represent an acute type?—They were not acutely ill, but it was more of an acute type of the disease in relation to the time they had been engaged. One case in the second part of 1922 had been in the factory only three or four months. His was the most acute colic we have had, but the case cleared up remarkably quickly as soon as we got his bowels in proper order. If I remember rightly he was back at work in about a fortnight.

1661. Of those early cases how many returned to work?—We have one man who has been working in lead stuffs since without signs of lead poisoning. Most of the other men left.

1662. To the best of your knowledge was there any general impairment of health following the attack?—No; they all recovered.

1663. So your average for the last two or three years indicates comparatively a negligible amount of poisoning?—Yes.

1664. Would you be inclined to attribute this to the absence of hazard or the observance of precautions on the part of the men?—I think both. The men are coming to realize that precautions are necessary. At first they used rather to scout the idea of them when we were lecturing them on the matter. I believe they thought we were exaggerating, and some were most careless. The majority of the men who have suffered were careless in their habits.

1665. Were they in physique more or less robust than the average worker?—Three of the seven cases were quite well-built men and robust. The others were doubtful. Now we do not engage a man who is not comparatively robust. Men are taken into employment on the presumption that I will pass them.

1666. You examine the men accepted for work?—Yes. I see them every Tuesday. If a man is engaged before that day it is on the condition that he will be passed by me.

1667. In that examination would you reject a man of poor physique?—If he was definitely of poor physique I would, although I have no standard to work upon.

1668. You would not, for instance, adopt the army standard of fitness?—No.

1669. In your opinion does susceptibility to lead depend on physique?—It does not from my experience.

1670. But you recognise the fact that certain individuals are vastly more susceptible than others?—I feel quite certain about that.

1671. Do you inspect the men's mouths?—My routine is to take their blood pressure once a month, from which I have found nothing, I weigh them regularly, inspect their mouths, and more or less get a general idea of their appearance. Those are the main things. Apart from those I keep a look out for the appearance of any anaemic signs.

1672. In the event of a man exhibiting signs of advanced pyorrhoea and dental caries, would you give him any advice on the matter?—Yes.

1673. Do you recognise that as a more or less important factor?—Yes.

1674. You were a member of the Commission who inquired into miners' diseases at Broken Hill. During your work there did you have any special experience of the deleterious effects of carbon monoxide?—No.

1675. Have you at any time seen cases which you considered subject to chronic poisoning by carbon monoxide?—No.

1676. Are the employees at these works all or practically all of British nationality?—Yes.

1677. Are there any southern Europeans?—No.

1678. *By Mr. Pearson*—You said you considered that susceptibility to lead poisoning did not depend on the physique of the man. As far as this Commission's investigation at Port Pirie has gone, south-eastern Europeans appear to be particularly liable to get it. Do you think their diet and probably defective nourishment would be a contributing factor?—Defective nourishment would be most certainly, I think. I have no experience of it, but it suggests itself to me that it would be.

1679. We have had evidence that that class of workman lives largely on tinned foods. Do you think that that might make him more susceptible than a man who has had an ordinary diet?—I think so. One of the things we impress on a man who has had any trouble is that he should drink plenty of milk and eat plenty of fresh vegetables.

1680. *By Mr. Gepp*—For what period was your appointment with the Broken Hill Commission?—I was there for only two months, covering the latter portion of their stay.

1681. Was your work in connection of cases?—Yes, generally physical examination.

1682. Our evidence to date shows the occurrence of a large number of reported cases of mild, very mild, and sub-acute types, which for the moment we are accepting as cases of plumbism, subject to further review. At the Port Pirie Smelters we have the peculiar phenomenon of a very rapid increase simultaneous with a considerable improvement in working conditions, which indicates either very intense diagnoses and (or) a considerable number of men coming on to the job who are more susceptible or less tolerant, and (or) other things, such as other conditions in the work which we will have to recognise apart from lead, since the symptoms are nearly all of a mild type. For instance, wrist drop is almost, if not entirely, absent. Pallor, anaemia, want of muscular tone, loss of appetite and headache are sometimes complained of. Would you say that there are a certain number of diseases which predispose to plumbism?—From my experience here I have

nothing to indicate that. If a man is down in health as a sequel to influenza, for instance, I think it is most likely he is more susceptible. To a certain extent, where possible, we "nurse" after an illness, in that the foremen are asked to keep an eye on them. What is done in this way is merely precautionary. I have not had a case of plumbism following such an illness.

1683. Would you say that amongst the more common causes of susceptibility to lead are alcoholism, acute or chronic; syphilis, gout, and anything which tends to cause intestinal stasis or constipation?—Most certainly.

1684. There is an interesting point connected with the difficulty of diagnosis. The Committee on Industrial Paints appointed by the Home Secretary in England in 1923 were instructed to re-examine more particularly in the light of further information which became available since the departmental committee was appointed in 1911 concerning the use of lead, as in the painting trade, particularly in view of the resolutions passed by the Geneva Conference. They make the following statement:—"As to the allegation which has also been made that cases among house painters are not verified, it must be remembered that in lead poisoning diagnosis the practitioner confronts difficulties which do not trouble him in the notification of infectious diseases. There is no standard as to what constitutes lead poisoning, and every medical practitioner must form his own criterion." Would you agree that the criteria are difficult to define, and, therefore, that each practitioner must, to a certain extent at least, take many things into consideration in addition to the symptoms stated by a patient?—Yes, the main difficulty we are in is to get a standard as to what is lead poisoning. Practically any one of the symptoms or signs that you get may constitute lead poisoning, and it is rare to get several of them together, but we have no standard to go on. A man with a blue line in his gums has not necessarily got lead poisoning, and a man with lead in his urine has not necessarily got it.

1685. Some authorities say that pyorrhoea, anaemia, and exposure to lead co-existing may very easily be wrongly regarded as lead anaemia. Do you agree with that?—Yes. A good number of the blue lines I have seen arose from pyorrhoeal condition.

1686. Based on your experience here, and remembering the difference with works with, say, 50 men and works with 2,000, would you say it would be desirable to institute full time medical attention in such an industry as the big smelters at Port Pirie?—The question resolves itself entirely into one of the time required for seeing the men. Here I see 40 men once a week, my visit for the purpose occupying about two hours.

1687. If you were the responsible officer for hygiene at a big works, would you say you ought to have as much medical service as would give you a good job at the works from the standpoint of protection from lead and other troubles?—Apart from the medical inspection there is not much else. I always see the foremen. Apart from seeing the men I occasionally go over the factory and make suggestions, and between us all here we have gradually added more precautions.

1688. I presume you agree with published statements that dust is the main trouble?—Yes.

1689. If you were the medical officer in charge of the medical service at works like those at Port Pirie, would you feel that the institution of a dental clinic in conjunction with it, where attention to the men's teeth could be done well and cheaply, would be desirable?—Yes, it is an excellent idea.

The witness withdrew.

GEORGE HERBERT PODGER, works manager for the British Australian Lead Manufacturers Proprietary Ltd., Cabarita, New South Wales, was sworn and examined:

1690. *By Mr. Gepp*—What are the main products of your works?—We are making at present solely white lead in oil.

1691. How many men are employed?—At present, 43. Of that number 10 are employed handling metallic lead and dross, 13 are employed in handling (white lead or damp lead), four in handling white lead in oil, and 17 in sundry work, so that there are only 27 men out of 43 who are actually handling lead.

1692. Will you supply the Commission with a copy of your printed instructions that are posted up at the works?—Yes. (Exhibit 21.)

1693. Have you any further points to make concerning industrial hygiene and the discipline you consider essential in any operations where lead is handled?—I think it is very desirable that there should be some definite order to the employees to carry out those instructions. The Department of Labor and Industry makes certain regulations which the employer has to carry out, but there is no compulsion on the employee to carry out his part of the regulations. In England, if a man breaks one of the Home Office regulations he is liable to be summoned before a court of summary jurisdiction, and fined. I have known them to be so fined for not wearing respirators. It would be very desirable to have some compulsion on employees as well as on employers.

1694. *By Mr. Pearson*—You advocate similar regulations in corresponding industries here?—Yes. Practically speaking, the only method we have of enforcing regulations is to warn a man a second time, and then if he does not conform, discharge him; but meanwhile we may be fined, and there is the possibility of the man becoming sick through no fault of our own.

1695. Your recommendation would be that statutory regulations governing both the company and the men employed would be a benefit in all such industries?—Yes.

1696. Would you also say it would assist in maintaining the best health in everyone connected with such industries if those statutory regulations included regular medical supervision?—Yes.

1697. What power would you give in connection with such questions as compulsory bathing?—It is desirable that a man engaged in a section of the work which is admittedly hazardous should bathe every day before leaving work. A regulation for bathing once a week would be besides the point. We encourage the men to bathe every day.

1698. By places that are admittedly hazardous I take it you mean places where the men come into direct contact with lead or are handling lead products?—Yes, and are exposed to dust. I have chiefly in mind the process of stack stripping.

1699. *By Mr. Gepp*—It is generally admitted that the respiratory tract is the main entrance of lead into the body as far as plumbism is concerned?—Yes.

1700. When you were having trouble due to splashing, how do you think those cases occurred? Was the trouble due to the splashes drying and dust coming therefrom?—Yes, men were splashed from head to feet. The splashes dried rapidly, and there is no doubt that a man who became ill inhaled a quantity of very fine dust.

1701. Did he take off his clothes afterwards?—Yes.

1702. It is also possible that while he was working the splashes dried and dust, getting into the air, was inhaled?—Yes, I think so.

1703. There are two ways in which clothes can be handled in an industry such as this, namely, by a complete change into working clothes, and by the wearing of overalls over ordinary clothes. If you were laying down an ideal system for such an industry, where there is a certain amount of dust, what would you say would be the better way?—The ideal is undoubtedly complete change in a separate change house. I find that in hot weather the men discard practically the whole of their clothes and wear nothing but the overalls, or they will keep on a singlet and discard the overall coat which is given to them. The ideal would be to have complete change and to have the men pass practically naked from a point where they leave their own clothes into another place where they will put on overalls, and where at night they will leave their dirty clothes and pass through to the other place and get back to their own outdoor clothes again.

1704. With regard to overalls, which theoretically should protect the men fairly well, do you find any trouble through men leaving them open, unbuttoning them round the neck, and so on?—Yes; if it is at all warm they discard the coat altogether.

1705. That situation would be helped if here were definite statutory regulations as to how they should be worn?—That would give us more power over them.

1706. Are overalls washed every day here?—Yes.

1707. Has that been brought about as the result of the absorption of an amount of lead which accumulates on overalls during the day?—Yes; splashes dry overnight, making the men liable to inhale dust when putting on a dirty set next morning. My experience in the past was that it was very much better to give a man a clean set every day.

1708. You had experience in this industry in Great Britain before you came here?—Yes; I have now been over 24 years in the industry.

1709. Briefly, what has been your experience of the precautions taken during your long period of work in this industry from the standpoint of reducing the hazard?—Precautions have been carried out very much as we are carrying them out here to-day. The precautions we take here are based on the British regulations and experience with them in Great Britain. We have improved upon them somewhat. We have more modern facilities in the way of baths and washing apparatus. We have improved on them in respect to daily change of overalls, and working conditions in the factory itself are infinitely superior to what they were in the Old Country. My experience there was that, roughly speaking, on an average in a white lead factory, employing about 60 hands, you would get about one case of colic per annum, and that case always recovered and returned to work in a short time. I have never known a fatal case or a case in which a man has been permanently disabled. The only precaution in my experience which used to be taken and has since been dropped in England, and has never been established here, was the provision of milk or hot coffee to the employees before starting work, but in those days the time of starting work was 6 a.m., and admittedly nobody had time to eat before commencing work.

1710. When were the statutory regulations originally introduced by the British Government?—About 1895.

1711. Did those regulations reduce the incidence of the disease in the industry?—Yes, enormously. The drop in the number of cases was almost instantaneous. I think in the first two years the drop was to a fifth or a sixth of the number previously.

1712. Were those regulations issued by the Factories Branch of the Home Office?—Yes.

1713. There were penal clauses therein applying both to employers and employees?—Yes.

1714. Were they strictly carried out by the Home Office and the employers?—Yes; inspectors used to pay frequent visits, going carefully round a factory and looking into every detail.

1715. Were those regulations mainly based upon the elimination of dust?—Yes; and cleanliness of the person.

1716. *By Mr. Pearson*—What were the duties of the certifying or reference surgeons as provided under the English regulations?—A medical officer appointed by the employer acted as certifying surgeon. That is to say, he certified as to a case of lead poisoning. He made a weekly inspection in white lead works and a monthly inspection in smelting works. In the case of a dispute between the certifying surgeon appointed by the employer and a general practitioner there was appointed a medical referee, whose decision, I think, was final.

1717. Would that medical referee be appointed by the Home Office?—Yes.

1718. *By Mr. Gepp*—In that connection a system has been introduced at Broken Hill by the New South Wales Government under a special Act, whereby there is a board of three medical men, one of whom, the chairman, is a Government full-time officer, one is nominated by the employers, and one by the employee, and a general practitioner need not certify as to any man beyond stating that he believes the man may be suffering from lead poisoning. The case is then sent to the board, and the board, which is merely a referee, issues a certificate, signed by the chairman, giving the decision of the board in respect to the case. Would that appeal to you as being preferable to having a single referee after two medical men have given their decision?—I think it is preferable in this country, because the medical profession here has not a very wide experience of lead, and there is always a very debatable point as to what constitutes lead poisoning. It is a difficult matter to differentiate between lead absorption and lead poisoning and to have a board of three is an excellent idea.

The witness withdrew.

The Commission adjourned.

Friday, May 22nd, 1925, at 10 a.m.

[At Parliament House, Sydney].

Present—

Dr. K. R. Moore (Chairman).

Mr. H. W. Gepp.

Mr. J. L. Pearson.

HENRY GEORGE CHAPMAN, Professor of Physiology in the University of Sydney, and formerly Professor of Pharmacology in the University of Sydney, was sworn and examined:

1719. *By the Chairman*—You were Chairman of the Commission appointed by the New South Wales Government to inquire into miners' diseases at Broken Hill?—I was Chairman of the Technical Commission appointed by the Board of Trade, and afterwards I was Chairman of the Commission appointed by the State Government.

1720. Part of the work accomplished by that Commission had to do with investigation of the effects of lead on the miners?—Yes.

1721. Will you give this Commission, in your own manner, a definition of the term "lead poisoning," with any comments you may care to make?—Lead poisoning is any condition induced by the introduction of lead into the body which may shorten or tend to shorten the duration of life or lessen the efficiency of the mechanical energy of the body or diminish the comfort or wellbeing of the body. I do not regard any change induced in the body by lead as necessarily being lead poisoning. For example, people exposed to lead may diminish in weight by 1lb. without any other condition of the body being altered. I do not consider that such a fall in weight should be regarded as lead poisoning. If the condition shortens or tends to shorten life, or if it diminishes physical efficiency or capacity to do work, or brings about a change which diminshes comfort or wellbeing, I think the change should be regarded as constituting lead poisoning.

1722. Do you then recognise certain states as a result of the absorption of lead which are not to be classified as lead poisoning?—No; but I do regard it as a fact that lead can be introduced into the body without producing poison.

1723. You consider that there is a reasonably well marked boundary line between what we might term absorption of lead without poisoning and lead poisoning?—Yes; the Technical Commission saw at Broken Hill some 2,500 men, all of whom were excreting lead, and who from the evidence before us had been absorbing lead during the period of their employment at Broken Hill, and a number of whom had worked there for periods more than 30 years. Those 2,500 men gave no history of ever having suffered from illness of any kind whatever. On medical examination they presented no sign of any disease. They fell into groups. Well over 100 had worked at the mines for 30 years, more between 20 years and 30 years, and more again between 10 years and 20 years, and still more for under 10 years, so that they had been exposed for varying periods. They had never had an illness of any kind, and when examined they showed no signs of disease at all. They would have been accepted as first-class lives by any insurance company.

1724. You came across certain cases of definite lead poisoning at Broken Hill?—Yes.

1725. Can you describe a typical case which you met there?—The Broken Hill cases of lead poisoning form two groups. Firstly, there was a group consisting of about half of the persons considered to be suffering from lead poisoning, who gave a history of having suffered from repeated attacks of colic, ranging mainly from 15 to 20 years previously, who gave a history of having suffered from definite paralysis of the type recognized to be due to lead, and 31 out of 35 of whom at the time we examined them showed evidence of that paralysis in their bodies, who were under weight, who showed pallor and the earthy tint associated with lead poisoning, who showed signs of malnutrition in the absence of subcutaneous fat, and who suffered in varying degrees, but not all of them, from headaches, giddiness, and tremor, and some of them also from Bright's disease. These represented the first group, that is, persons who had in their bodies undoubted signs of having had previous lead palsy, and who suffered from this condition of malnutrition. In addition, there was another group of persons showing a long history of colic, which, in many cases, was checked by evidence that they had been in hospitals suffering from colic for weeks and months, but no history of ever having had nervous paralysis or paresis. They also suffered from pallor and anaemia, showed the earthy tint, showed this peculiar cachexia, malnutrition, absence of subcutaneous fat, and some of them suffered from headaches, giddiness, fibrillary tremor in the muscles, general muscular wasting, loss of weight for their height, and about 50 per cent. of them had Bright's disease, showing various signs such as raised blood pressure, thickened arteries, retinal haemorrhage, and so on. Those constituted the second group. All these men were over 40 years of age. I draw your attention to Table III. on page 4 of our second report, which shows the distribution of these symptoms. Many of them had chronic constipation, giddiness, fits, and pains in the limbs.

1726. *By Mr. Gepp*—How many were in each class?—Thirty and 31.

1727. Which were the more severe?—All were about the same, but there were different manifestations.

1728. You would not call one more severe than another?—No.

1729. What names would you give to the two classes?—One had nervous signs and those in the other class had not.

1730. Did one class show more signs and symptoms of nephritis than the other?—No. They were divided into these groups because the first contained those who had unmistakable lead poisoning of a subacute type, and who had, moreover, the signs of malnutrition. The second group resembled the first in every way except that they did not have the slight traces of extensor paralysis and so on.

1731. *By the Chairman*—Would you say that the type of cases which you met at Broken Hill was typical of industrial lead poisoning?—No, not typical.

1732. Could you describe briefly a typical case, or would you consider that the manifestations vary tremendously according to circumstances?—It depends upon where you say a case is typical of. As far as Sydney is concerned, we do get a typical form of lead poisoning, which might be called industrial lead poisoning. In other parts of the world there are other conditions which do not occur here, and other forms of typical lead poisoning of an industrial nature which we have not seen in Sydney.

1733. *By Mr. Gepp*—Is there any reason for that?—There are certain industries, such as potteries, in which acute lead poisoning occurs, usually known as lead encephalopathy, which leads to death within a few months. This disease is found in association with certain industries in Europe. We have not those industries here.

1734. Is that form brought about largely through exposure to the hazard over short periods?—Yes.

1735. It is in such cases that brain affections occur?—Yes. We have apparently no considerable group of industrial workers exposed to such large amounts of lead dust in their daily occupation.

1736. Is there any association between the encephalopathy and what are described as nervous symptoms of lead poisoning?—It is a more acute form of nervous lead poisoning. It is not what we commonly mean when we refer to the nervous type of lead poisoning.

1737. It would not be a more intense manifestation of the nervous type?—It is a more intense manifestation of the nervous type. One is a brain lesion, whilst the ordinary nervous type is a peripheral or nerve lesion.

1738. Supposing a man is exposed to conditions which give him a severe type of lead poisoning, if he continued in those conditions would he then develop into brain lesion?—No.

1739. *By the Chairman*—We have been inquiring into the incidence of cases and other aspects connected with cases of reported plumbism which have occurred at the Port Pirie smelters. I want to read to you a definition of the typical cases met with there, and you may desire to comment on those statements:—

(Port Pirie Evidence, Question 1221.) What are the prevailing symptoms complained of by persons afflicted with plumbism in your experience?—In my experience the more usual symptoms complained of are weakness and lassitude, sleeplessness, loss of appetite sometimes associated with vomiting, abdominal colic, and constipation, and pains in the extremities.

(1212.) In your experience, I presume you have noted varying types of the disease. If so, will you describe the prevailing signs elicited from those main types?—I will first describe the abdominal type, in which the prevailing symptoms would be abdominal colic and constipation. Then there is the anaemic type, in which the prevailing indications are anaemia and other associated blood changes. Then there is the neuritic type, in which the prevailing symptoms complained of are pains in the extremities, and the signs found are tenderness over the main nerve trunks and muscular wasting. The fourth type might be classed as the cerebral type with signs and symptoms of acute brain involvement, and, lastly, there is the arterio sclerotic type, in which the symptoms would be signs of arterio schlerosis and chronic nephritis.

(1213.) Does, in your opinion, one particular type prevail in the cases you have seen?—Among the cases I have seen, what I have classed as the neurotic type would prevail, but not unassociated with the symptoms of the other types as well.

That was from one witness. I will give a definition by another witness on similar lines:—

(1316.) Relating to the cases under review, were the bulk of them acute, subacute, or chronic?—Subacute.

(1317.) By subacute to what particular set of conditions do you refer, or the particular type of case?—I should describe such subacute cases as exhibit pallor, blue lead line in the gums, evidence of loss of weight, complaining of lack of appetite, foul taste in the mouth, constipation, and abdominal sense of unrest, with occasional exacerbations of colicky pain, loss of muscular tone, sleeplessness, and pains in the joints and limbs.

Would you care to give the Commission any comment on those statements?—I feel great difficulty in commenting upon this information. All I can say as to the first of those descriptions is that I would not describe lead poisoning in the terms used there. As far as the second description is concerned, I think that the description is that of very mild incipient lead poisoning, but I would regard the occurrence of colic in a case as absolutely necessary to be sure of lead poisoning since those very varied symptoms are found with so many conditions. The one thing which I think is necessary in those cases to make them recognisable lead poisoning is colic. I regard the occurrence of colic as the one important symptom of lead poisoning of this type. With regard to the first group, not having seen the cases I would not care to comment. All I can say is that they do not resemble the cases I know of industrial lead poisoning as they occur in Sydney and Broken Hill. Here, in order to clinch a diagnosis of lead poisoning, we regard as essential that there should be undoubted evidence of colic or undoubted evidence of nervous lesion. Without that we do not regard the symptoms as being diagnostic of lead poisoning. I am not thinking now of cases like those we saw at Broken Hill, but cases of sub-acute or mildly chronic lead poisoning. We are not talking of the delayed chronic form which occurs

in people who have been exposed, roughly speaking, more than 20 years to lead.

1740. That first witness mentioned quite definitely as among the signs tenderness of the main nerve trunks and muscular wasting?—General muscular wasting is not, in my opinion, a sign of early lead poisoning. The typical wasting of muscles in lead poisoning occurring after a year or two of exposure to lead, is restricted to particular muscle groups. It may be in the extensor muscles of the forearm, or it may be in the thenar eminence, or it may be in the extensor muscles of the leg, and very occasionally elsewhere, but the characteristic feature is that it is not general, but particular.

1741. Will you glance at the summary of the blood examinations performed at the Commonwealth Health Laboratory Port Pirie, and make any comment relating to the degree of anaemia?—I do not want to offer any comment.

1742. Would you consider that definite cases of lead poisoning, even though mild, would present a series of blood pictures consistent with them?—Yes. It is just as consistent with lead poisoning as with anything else. I do not regard it in any way as being evidence for the existence of lead poisoning.

1743. Will you give the Commission your views on the importance of blood examination in regard to the diagnoses of lead poisoning?—The blood examination is important in making certain of the presence of anaemia. The blood examination also enables one to make certain of the type of anaemia as that which may occur in lead poisoning. It enables one to exclude certain anaemias which are different from those seen in lead poisoning. With regard to any special blood change, in certain industres in which exposure to lead takes place changes in the red blood corpuscles occur, but not in all industries in which men are exposed to lead. In my experience no characteristic change in the white blood corpuscles exists in lead poisoning. I regard the estimation of haemoglobin as a most important sign of anaemia in persons suffering from lead poisoning. I think, further, that that should be done by an accurate method.

1744. Do you regard the Hawkesly-Haldane haemoglobinometer as an accurate method?—Yes.

1745. Referring to changes in the red blood cells, I am presuming that you refer principally to basophilic degeneration? —Both to that and changes in the shape of the red cells.

1746. Do you consider that a pathologist on examining the film of blood can say, "This picture points definitely to lead poisoning"?—I definitely do not think that.

1747. Was basophilic degeneration discovered in the blood of Broken Hill miners to any great extent?—Not at all. One sees as much of that in practically normal people. In painters and plumbers basophilic degeneration is seen, though I have no idea of the amount. We have not examined enough painters or plumbers to determine the proportion.

1748. Do you consider that painters and plumbers are subject to the absorption of a relatively large quantity of lead per diem?—Yes.

1748A. Do you consider that that might account for the more frequent appearance of basophilic degeneration?—I have no evidence that they absorb more lead than people at Broken Hill.

1749. Do you think the former absorb lead in a form more calculated to give rise to diagnostic symptoms?—No. I think that when you get the quantities which are absorbed at Broken Hill the form makes no difference to the condition.

1750. Can you give any explanation why basophilic degeneration should occur more often in those cases than in miners at Broken Hill?—No. Some people assume that basophilic degeneration in painters is due more to turpentine than to lead. I do not subscribe to that. I do not know.

1751. *By Mr. Gepp*—Does basophilic degeneration occur in people who are not exposed to lead or other industrial disease? —Yes.

1752. Is the general condition of anaemia, from whatever cause, necessarily indicated by basophilic degeneration?—No. There may be practically no anaemia, yet basophilic degeneration may be present.

1753. There may be anaemia without basophilic degeneration?—Yes, very frequently.

1754. What are the blood indications of anaemia and pernicious anaemia? Is it lower haemoglobin count or what is it? —You may have a diminished percentage of haemoglobin or a diminished number of corpuscles, or they may go together or separately. Then you may get less haemoglobin in the individual corpuscle, or sometimes the fall in the number of corpuscles is accompanied by an equally proportionate fall in the amount of haemoglobin.

1755. *To the Chairman*—With regard to the mode of entry of lead into the body, the evidence available shows that the greatest amount of industrial lead poisoning is induced by lead entering the respiratory passages, and the evidence available also shows that the amount of lead which produces industrial lead poisoning must be greater than two milligrammes of lead in dust in the amount of air breathed per shift or per diem by the employee. We are inclined to think here that the quantity may be reduced to one milligramme, though we have never seen cases of lead poisoning here in which the quantity breathed in amounted to only one milligramme.

1756. The very essential point, surely, is to define whether that is the absolute minimum that would affect the most susceptible person. We know of a man having been killed at Broken Hill by 110 volts of electric current and other men have not been killed by 550 volts. When you say one milligramme or two milligrammes do you mean the amount that will cause plumbism in the most susceptible, the least susceptible, or the average person?—Any susceptible.

1757. That is taking susceptibles as a class?—Yes. We think there is undoubted evidence of lead poisoning from breathing air containing one or two milligrammes in four cubic metres, though it is not yet possible to be definite on that point. All our experience goes to show that a quantity of one milligramme in the daily air breathed involves risk, and for local purposes in this State we have laid down that .5 milligramme in 10 cubic metres is safe. We have never seen anything at all to suggest that .5 of a milligramme of lead dust in 10 cubic metres of air ever produces lead poisoning.

1758. *By the Chairman*—A workman could continue breathing or ingesting .2 of a milligramme per diem of lead for the rest of his natural life without any ill-effecting at all?—It looks like it. Those quantities which we mention are the quantities of dust in the air. That is not saying how much goes into the person's body.

1759. *By Mr. Gepp*—When you say the amount of lead, do you take it on any average of the lead content in the dust?—Those figures are for lead, because they are arrived at by a method which determines lead.

1760. Supposing you were breathing dust which contains 5 per cent. of lead and took in two milligrammes of lead, would that be as harmful as the same two milligrammes taken in dust containing 50 per cent. of lead?—I think it would be just the same. I referred to milligrammes of lead. Some industrial lead poisoning is caused by alimentary absorption of lead, but what evidence is available shows that much larger quantities are required to produce lead poisoning through the alimentary canal in industrial processes. The suggestion is that 15 grains per diem is the minimum amount, but I have no evidence of my own on that question. All the industrial lead poisoning I have seen in Sydney has been due to respiratory absorption. There has also been put forward the suggestion that lead poisoning takes place through the skin, but all one's experience here is that there are few such cases, even if it does take place occasionally. Under ordinary circumstances people can be covered with lead dust, and even by lead oxide, and show no lead poisoning. There is very little evidence of absorption through the skin. With regard to the terms "lead absorption" and "lead poisoning" the term "lead absorption" was regarded by members of the Broken Hill Commission as being a chemical term only, indicating that lead is passed into the blood, and the evidence of that fact is always the discovery of lead in the urine. In our experience whenever lead is absorbed, lead appears in the urine.

With regard to the types of lead poisoning, there are the acute and subacute forms. Many people call the subacute form chronic lead poisoning. We prefer to divide them into acute and subacute forms, which develop after some months, or, rarely, shorter periods of exposure to lead, and secondly the delayed chronic form, which develops after years. The acute and subacute forms are either nervous or alimentary, and the delayed chronic forms are either renal or general.

1761. *By the Chairman*—Most of the cases which have been described as occurring at Port Pirie and presenting an industrial history of months or very few years would appear to be of that acute or subacute type?—Yes; I think if they are cases of lead poisoning they should either show colic or localised paralysis or paresis.

1762. I would be glad if you will comment to the Commission on the subject of the differential diagnosis of plumbism?—In considering the differential diagnosis of plumbism arising as an industrial disease, attention should be given to the examination of the industry and the examination of the individual. The examination of the industry is in respect to the determination of the amount of exposure to lead, and evidence as to the number of individuals in the industry who absorb lead. We regard that as of the greatest importance in determining the danger in an industrial group. I do not think any industry can be properly examined without a determination of the number of individuals who are absorbing lead. By that we mean the number of people who are excreting lead in the urine. That needs to be done first. We examined printers in Sydney and found no person absorbing lead. There was no lead in the urine. Our whole medical examination is profoundly influenced by that. Then we come to the examination of the individual in the light of the knowledge gained in that other respect. For that purpose a complete examination of each individual is necessary. The reason for that being made is that many of the signs and symptoms which occur in persons suffering from lead poisoning occur in other conditions, and it therefore becomes of great importance to determine whether any other condition is present. In order that that medical examination should be complete I think the use of some printed form which covers the examination to be of great value, so as to be certain that accurate information is obtained on all points from each individual. Very great attention should be given to the history, because in my experience the history is one of the factors of utmost importance in arriving at the diagnosis, especially the history of illnesses, such as colic. The patient should certainly be asked what doctors they consulted and when they went into hospital, and attempts should be made to obtain evidence from doctors and hospitals in regard to the condition of the patient. In this respect I would like to say something about malingering, which is often supposed to be likely to occur in connection with history. My experience is that malingering has no relation to industrial lead poisoning. In my own experience I recollect only one case in which I saw it attempted, and in which every one who examined the person concerned was able to recognise at once that the man in saying he suffered from an attack of lead colic was telling a deliberate lie. As a matter of fact, in the hands of a competent medical man who asks questions, it is difficult for a lay patient to answer a question in such a way as to carry conviction unless he is telling the truth, and nearly always they give definite evidence that their attack was not an attack of colic. Colic is a very severe condition in lead poisoning, so severe that a man must—at any rate when he first gets it—seek medical advice. When people suffer from attacks of colic at their work the attack is so severe that every one in the place becomes aware that the patient is severely ill. Such persons have often to be carried home. So fraud, in my own experience, occurs very little. I do not think people should be merely asked whether they have had colic. In my opinion that invites them to say that they have had colic, and they do not know what it is. If they are asked to describe their illness it is possible to determine whether they have had colic or not. In dealing with the diagnosis of individuals standards should be laid down before starting examinations. In dealing with individual cases the purpose of the medical examination should be to determine how far any individual conforms or does not conform to these standards. In my opinion, as medical referee on these cases in New South Wales under the Workmen's Compensation Act, no difficulty is experienced in diagnosing acute or subacute cases, that is, cases which arise after exposure for months in an industry. Considerable difficulty arises, however, in dealing with delayed chronic cases, the difficulty being to determine whether some other condition may have produced the wasting, and great difficulty is experienced when you have some other condition present. It is then necessary to determine whether that other condition accounts for the whole of the wasting or not. In acute and subacute cases one's experience is that one does not have difficulty, because in laying down standards one regards colic as being necessary in alimentary cases to determine lead poisoning, and paresis as necessary in the nervous cases, and simply because a man is pale and out of sorts one should not call it lead poisoning.

1763. Do you consider it necessary and practicable that a general practitioner should in all cases of suspected lead poisoning take out the electric reactions of the muscles?—Not unless there is still other evidence of localised paresis.

1764. In any case an electric test apparatus should be a part of the working gear of practitioners in a lead centre?—I do not consider that it should.

1765. Will you now deal with the question of susceptibility and variations of susceptibility in individuals?—The recognition of the fact that of persons exposed to lead, some only suffer from lead poisoning has lead to the deduction of the existence of what is known as a group of susceptible persons, and it is now recognised that the failure of all the early regulations for the control of lead poisoning to diminish the number of lead poisoning cases in England during the first 20 years of control was due to the failure to recognise this fact. The number of susceptible persons in a general population, as determined by the Technical Commission at Broken Hill, and as has also been determined, though not so accurately, in respect to certain industrial groups in Sydney, is about three per cent. That is, three per cent. out of a general population (of occupied males) are likely to suffer from lead poisoning. When men enter into a lead industry, most of them lose weight, frequently for some months, but later they regain their normal weight; but provided the quantity of lead in the air is about two milligrammes in five cubic metres, about three per cent. will show anaemia, pallor, further loss of weight, gastric disturbance, constipation, and sooner or later develop colic or an attack of paralysis. Whereas medical history in other parts of the world will show that some people get attacks of paralysis without any warning attacks of colic, in Australia colic invariably precedes paresis. Well over 90 per cent. of workmen exposed to these quantities of lead show no colic and no tendency to peripheral neuritis. It is on that ground that it has been recommended that regulation of the conditions of the industry rather than prohibition of the use of lead should be the object of hygiene. With respect to tolerance, some authorities do hold that people exposed to small quantities of lead can ultimately take larger quantities without ill effect, but on the question whether toleration takes place, I can offer no opinion. I have never seen any evidence of that fact. The term "toleration" should not be used for the fact that lead is taken into the body without producing symptoms, because it is a general law in regard to drugs that you must have a minimum quantity before you get any action in the body.

1766. In your experience, does nationality bear any relation to susceptibility?—No. As far as Broken Hill was concerned, we examined people belonging to many nationalities, but found no relationship between poisoning and any nationality. There is some general evidence that certain nationalities are susceptible to certain conditions, but I know of no evidence of that kind in regard to lead.

1767. As we have figures from Port Pirie showing that the great incidence of lead poisoning occurs among Mediterranean Europeans, it is possible that their mode of living, especially during the earlier months of their residence in Australia, may

determine a greater absorption of lead and thereby cause poisoning?—It is possible if you have evidence to that effect. I know nothing about it.

1767A. We have evidence that these people are not as cleanly in their habits or as well fed as they should be?—I do not think cleanliness or feeding has anything to do with lead poisoning.

1768. Ignorance and susceptibility in this particular case may be synonymous terms in their results?—Yes, it may be so. I am opposed to telling workmen that ordinary cleanliness has anything to do with the prevention of lead poisoning. I do not think it does prevent lead poisoning, because lead poisoning is due to the inhalation of dust, and whether they wash their hands or eat with lead on their hands, or roll tobacco for cigarettes or pipes, does not really enter into the matter. I do not say that notices urging cleanliness should not be put up, but it is misleading to suggest to the workmen that that prevents lead poisoning. I do not suggest you should not ask workmen to be clean in their habits, but it does not follow that you are going to lessen lead poisoning one iota.

1769. *By Mr. Gepp*—Surely in regard to the cleanliness of clothes, men working in a plant where there is a certain amount of dust floating around should not be encouraged to wear the same clothing as they wear outside, but should keep that clothing as free from contact with the dust as possible?—In my experience men have worn the same clothes outside as inside the works, and whether they do or not I have not found any more lead in the air. I do not think it matters.

1770. The amount of lead in the air and the amount of lead a man may breathe are possibly very different. Suppose men have their dusty clothes on outside the works and knock against timbers and so on, surely there would be more danger of inhalation of dust than there would be if their clothes were perfectly clean?—That might occur. I have never been able to see it and measure what would happen.

1771. We have had evidence in regard to white lead processes that there is more danger of inhalation of dust where splashing has occurred and the splashes have dried on the men's clothes?—I might grant that there is danger in that way.

1772. *By the Chairman*—There is a further point, that these Mediterranean people, we believe, not only go home from work without washing or bathing, but sleep in their clothes. A man with clothing impregnated with lead dust would be in a position to inhale considerable quantities?—I think one should determine the amount of lead they are taking into them. Urine examination would settle that point, and at the earliest opportunity of a post-mortem examination an attempt should be made to measure the actual amount of lead they have taken into their lungs.

1773. I have read, I think in a French publication, a statement to the effect that 350 milligrammes of lead in the body is regarded as a sufficient minimum dose to determine lead poisoning. Would you be inclined to agree with that?—I am of the opinion that much less causes lead poisoning.

1774. What would you consider necessary?—All I can say is that an amount of about 10 to 12 milligrammes distributed amongst the viscera generally has been found associated with typical lead poisoning. I have no figures whatever in regard to the body as a whole.

1775. Considerable quantities of lead, measured in milligrammes, may be stored in the bones?—It is said to be so.

1776. In the event of a debilitating disease a constant or prolonged demand on the metabolism of the bones or skeletal parts of the body might liberate lead in a form which would give rise to lead poisoning?—I do not know that.

1777. Do you think that a constant intake of lead is necessary to promote poisoning?—Yes, for a long time. I think sudden changes in nutrition produce lead poisoning. For instance, if a man goes on a drinking bout; but I have never seen tubercle produce attacks of lead poisoning. I am of the opinion that sudden changes in nutrition will undoubtedly produce attacks of colic or paralysis, and those types of lead poisoning.

No. 57.

1778. Will you state your experience as Medical Referee under the Workmen's Compensation Act in New South Wales as to the working of that measure here?—My experience of this Act is that it would work very well if it were thoroughly understood. A good many of the difficulties which arise under it are owing to the fact that its operations are not sufficiently known. For example, a man thinks he is suffering from lead poisoning, and is so certified, and his employer just takes it for granted under the certificate. According to the Act, if he is not satisfied he ought to appeal within quite a short period of time. Some months later, after having paid compensation all that while, he becomes dissatisfied, and begins to think what he ought to do, only to find that his opportunity for appeal has passed. No doubt these are disabilities which depend upon not understanding the Act, and probably such difficulties will disappear when employers more accurately know their liabilities. As a matter of fact, if any satisfactory appeal or determination is to be made, it should be as soon as possible after certification; but speaking generally, as far as I know, the Act works satisfactorily in this State. Some employers would not think that, because they say it tends to the position that whenever a person dies while engaged in an industry in which lead is a possible risk it leads to the possibility—even if it is not made—of a claim being entered for lead poisoning. I further think the Act here could be improved.

1779. Are there any further remarks you would care to make to this Commission that would be likely to help our inquiry?—Yes, there are some other statements which I have prepared. The first is in regard to physique and the question of susceptibility and toleration. The Broken Hill Commission found that physique had no influence upon susceptibility. With regard to inter-current disease, there is quite good evidence, I think, that certain inter-current diseases increase susceptibility to lead poisoning, and on that account persons suffering from certain diseases should be excluded from employment in industries in which exposure to lead is a risk. I believe that diseases of the kidneys fall under this heading. It also probably applies to all forms of heart disease. There are also certain other well-known diseases, such as gout, and so forth, constituting a very definite group of inter-current diseases, which render the lead trades particularly hazardous to those who are affected by those ailments.

1780. *By Mr. Gepp*—Would you bring alcoholism definitely within this category?—Not specifically. I suppose one could say acute alcoholism would undoubtedly be within it. Anyone suffering from alcoholic neuritis would certainly be more liable to suffer from lead intoxication. With regard to the quantity of lead dust absorption required to produce the disease, I have already given you our experience on that point, namely, that we have not seen any lead poisoning occur when the amount of lead in the atmosphere falls as low as one milligramme in 10 cubic metres. We therefore suggested as a regulation in this State that an amount of .5 of a milligramme in 10 cubic metres represents a safe limit. On the question of the rate of absorption of these compounds I have no evidence to offer. With regard to regulations for the control of conditions, they fall into two groups. Firstly, in respect to dust prevention, in my opinion the prevention of lead poisoning in an industry rests with the prevention of dust and the laying down of regulations for preventing the accumulation of lead in the air to an extent above the dangerous limit. In practice these measures really become questions of ventilation, also, as concerns certain parts of the industry, the proper devising of machinery so as to prevent the splashing of lead or the passage of dust from the machinery in various places. In this connection I would like to point out that very slight currents of air are sufficient to prevent the accumulation of dust. In many places there is an idea that the velocity of air required to prevent the accumulation of dust is high. In our experience a current of 40ft. per minute passing over places where lead dust is definitely being produced prevents any accumulation.

1781. Would it be possible to feel that current on the skin?

—It is just about perceptible. Currents such as 400ft. a minute are totally unnecessary.

1782. How do you define dust?—I mean the weight of lead estimated in a quantity of air—that which is gravimetrically ascertainable.

1783. Your point is that anything which remains suspended in the air will be removed by a current of 40ft?—Yes. You measure the amount of dust that a person would breathe in, the amount of dust that is suspended.

1784. *By the Chairman*—With dust, you would include fumes?—Yes; for this purpose fume is dust. I regard the elimination of dust as being of the greatest importance in preventing lead poisoning in an industry. The second part is connected with medical control. Where there is a considerable exposure to lead, and the hazard cannot be reduced below safe limits, I regard the most important factor in preventing injury to the workman through this lead—assuming always that the exposure is there—is proper medical control. This medical control is carried out with one object, namely, the removal of the susceptibles. In my opinion, if you still have a risk of lead in an industry, the whole aim of medical control should be to remove the whole of the susceptibles. Under those conditions no harm whatever results in the industry from the presence of the lead. Proper medical control, namely, the presence of a medical practitioner coming in contact with the work people and examining them, leads to the detection of possible cases of lead poisoning at a stage at which no permanent injury to the employee has taken place. Where there is a large industry with some thousands of employees it is advisable that the industry should provide permanent medical control. In regard to susceptibles, I am of the opinion that they should be removed from the industry where the test examination shows there is any risk. By a susceptible, I mean a person who suffers from repeated attacks of colic or from any attack of paralysis. By reason of the fact that a man had a single attack of colic I would not turn him out of the industry immediately, but would place him under systematic medical inspection. One other point I have noted is that I think notices should be placed prominently over works of this kind drawing the attention of workmen to the risk and impressing upon them the fact that their own health rests in their own hands, that the man who suspects he is suffering from lead poisoning and goes for medical examination will not be damaged, whereas if he tries to hide the fact that he is suffering, or does get treatment, he may become permanently damaged.

1785. *By Mr. Pearson*—You mean a notice on the lines of that used at Broken Hill as a result of your Commission's recommendation?—Yes, or that sent by the Board of Health in New South Wales to all industries. I consider that a preferable arrangement is the reading out to every workman, on appointment, of regulations, assurance being taken that he understands them, and further instruction should be given from time to time.

1786. *By the Chairman*—Do you consider that an entrance medical examination prior to appointment, or at the time of appointment is a necessity?—Absolutely.

1787. Would you consider the appointment in a large industry of a works dentist likely to be of value?—I think it would be of value to the industry. I do not know that it would be of value in the prevention of lead poisoning. It might be.

1788. *By Mr. Gepp*—It would surely raise the average standard of health in the industry?—Yes. As far as I know there is nothing to show that lead poisoning is associated with average health. I do not know that people who are susceptible are below average health in other ways. Many weakly persons work in lead industries without becoming injured.

1789. Have you seen Table L? (Shown to witness.) In that connection I will be glad if you will read the Commission's references from the South Australian Government which I hand to you. You will see from Table L that the number or reported cases has jumped from practically nil about five years ago to 234 last year, that is cases reported by the local medical practitioners. I stress "reported" cases because at the moment we have not reached the stage of definite acceptation of all the cases as specifically and definitely being plumbism, and we are examining possibilities at the works of any other condition that may be causing symptoms which might be mistaken for lead poisoning, such as the presence of extremely small quantities of carbon monoxide in the air?—That raises a very important point, because if you have one risk in the industry it must not be thought that all the illness is due to it.

1790. Is there any other industrial condition which you can suggest to this Commission for investigation, beyond lead and carbon monoxide?—I believe that at one time you had quite a lot of arsenic at Port Pirie. I went there years ago, and one of the things I looked at was the possibility of getting arsenic from the chimneys. Of course, arsenic is one of those substances which definitely produce chronic poisoning. I do not know if that possibility should be looked at. I suggest that one make an examination of the mortality figures at Port Pirie. One should look into the respiratory diseases and things of that sort, and see if there is a greater proportion of them than usual among these people.

1791. There have been cases of sickness under the Sickness and Accident Benefit Fund indicating such things as chronic bronchitis and gastritis as being among the main ailments?—Chronic bronchitis raises the possibility of sulphur dioxide, which I think you get in Port Pirie. It raises the question of the possible existence of irritant gases if you have much bronchitis.

1792. The amount you would get around the works in normal circumstances, according to my experience, would not cause any irritation?—I am just suggesting this as possible, or a matter to be borne in mind. If you have much bronchitis it is well to ascertain the cause of much bronchitis.

1793. The Commission then looked at the question from the standpoint of general health and that of the condition of the mouth, also the point of view of the tremendous increase in the ratio of Mediterranean Europeans to Britishers, and as a small point which may be of interest, evidence has been adduced which shows that these foreigners generally live to a great extent upon tinned fish and other tinned foods, and that they lived under conditions which are certainly not conducive to good health, at any rate in a Britisher. Have you any knowledge of any soluble lead content in tinned foods?—No.

1794. Sir Thomas Oliver cites a definite case in one of his books of a lady librarian who developed wrist drop and every sign of lead poisoning as a sequel to a regular daily diet of tinned salmon. Have you ever come across any similar circumstances?—Great care, I know, is taken in the making of tins in order to prevent the lead from reaching the food. I have made actually some investigations on this point, and never found any evidence of the presence of lead in either canned meats of various kinds or canned fruits.

1795. It is stated that lead compounds in solder are soluble in olive oil?—That is very likely. The aim in the making of tins is to keep the solder out of touch with the foodstuff.

1796. There is a feeling at Port Pirie that the use of the term "lead poisoning" affects the minds of a large number of men seriously, and they feel that they are going to be sick for a long time. For a time the certificate carried a statement as to the expected period of disability, which again had a very serious psychological effect upon the men. Do you know of any other term which might be adopted so as to obviate that position?—If you mean a synonym for lead poisoning you could use plumbism or chronic saturnism.

1797. In your Broken Hill recommendations why did you recommend the payment of compensation to susceptibles there? Doubtless this Commission or the South Australian Government will have to consider the question of what is to be done in regard to the men who have been employed in the industry and who are refused re-employment after having been carefully checked over three or four times and determined as susceptible by a committee, we hope, of three medical men. This point has already been raised in evidence, and if my memory serves me rightly the company said their conditions are different from those at Broken Hill, that their operatives in the

smelters are laborers mainly, that they often take a man from the gate and put him straight on to the bottom floor of the blast furnace. If such a man, then, had to be refused re-employment after a thorough testing, that fact would not affect his chance of obtaining employment on the wharves or anywhere else in Australia other than in a lead industry. The Commission have no specific reference on this matter, but owing to an indirect communication from the South Australian Government, are giving it consideration. We would, therefore, be very glad if you could tell us why the Technical Commission, of which you were chairman, at Broken Hill recommended the payment of compensation to the Broken Hill susceptibles?—In the first place we found from the industrial history that the majority of the persons who had worked at Broken Hill had worked as miners for the main part of their lives. Of course, many had worked at different occupations, but the employees as a group had worked most of their lives at the industry. We were, therefore, faced with the effect of taking people out of the industry and letting them work in another industry. Further, Broken Hill was an isolated place, and if a man went out of the mines he would have to leave Broken Hill and make his way elsewhere. Therefore it seemed to us that there was an obligation, if you took a man and said he could not be employed in the industry in which he had been employed, to give him an opportunity to get into another industry. Further, susceptibles, as we understand them at Broken Hill, fall into various groups, and we treated them in different groups. We recognised that there were susceptibles who might soon show some ordinary lead poisoning. In case there were any of these people we provided a small amount of compensation for them, but we really did not expect any. I think we did not see one case of that kind, and I understand that up to the present there have been only four cases of that nature in the whole of Broken Hill since December, 1919. The majority of the susceptibles, as we understood them, would be persons who came under medical examination for one condition or another and showed some traces of that condition, which I described to you as delayed chronic lead poisoning. If those persons showed delayed chronic lead poisoning we considered that they should be taken out of the industry and compensated. Those would all be men in middle life or older. Those men, taken as a group, had been nothing else but miners, and one felt that if they were to get out and start in a new occupation they would find it difficult. They had earned good wages in the mines and probably would not earn good wages in other industries, and we gave them varying amounts of compensation. These were, in general, the considerations in the minds of the Technical Commission which led them to suggest compensation to susceptibles.

1798. In the unfortunate absence of Mr. Commissioner Robinette, I would like to submit a question which I feel he would have asked. Under similar circumstances of an investigation at Port Pirie, with your broad knowledge of this subject, what would your view be regarding men who have worked for a period in the industry, who have bought homes there and settled down, and have their interests there, and who, owing to this particular condition, would have to be refused re-employment owing to susceptibility, if it could be shown in their case by the decision of the medical committee? No doubt they would have to sacrifice a certain amount of time and money to go somewhere else in the event of suitable employment not being available for them at Port Pirie. What would your view of their particular case have been at Broken Hill?—At Broken Hill I would have given such a man compensation. Concerning people of that class I feel that if a man who has been employed for some time and who has his home there is found to be a susceptible, he is damaged by lead. If it is found at such a stage one would expect that man already to have been certified for lead poisoning. If he has not been I do not think you are going to find him susceptible. If a man has been susceptible all this time he ought to have been damaged, and so I doubt if any of that class of man would exist. He ought to have had attacks of colic if he is a susceptible and has been there for any length of time.

1799. Take the case of a man who has been employed in some other industry around Port Pirie, and who, after that industry has faded away, has gone to the smelters to work. He already had a home in Port Pirie. Supposing that after working at the smelters for several months he shows definite signs of lead poisoning. He is given another period of employment, after which he again shows the symptoms, and is declared a susceptible. What would you have done in those circumstances at Broken Hill?—At Broken Hill we would have given that man a small amount of compensation. The minimum amount which I think we recommended in our report was £50.

1800. Would you care to say what should be the minimum period of service which should apply to a susceptible for compensation at Port Pirie and not at Broken Hill?—I would not like to express any opinion at all about Port Pirie.

1801. We looked into the question of the working of the Medical Board of three at Broken Hill, and the reports were very satisfactory. The Commission is considering a similar recommendation, namely, perhaps a full-time Government man as chairman, a nominee from the company, and a nominee from the men. Have you any comments, except, possibly, to say you agree with that system?—I think that system works well.

1802. Would you agree that the Broken Hill method of leaving it optional to the general practitioner to say whether a man is a definite case or not should also be adopted at Port Pirie?—In my opinion certification taken widespread has not been entirely satisfactory, but in places where medical men get a good many cases it becomes much more satisfactory. I think, however, there should be both certification and referee. In places like Port Pirie all cases should go to the Medical Board. At Port Pirie what should be done is what is done at Broken Hill, namely, that it should be compulsory to notify all cases of lead poisoning or suspected lead poisoning to the Medical Board.

1803. My own view is that the practitioner should be relieved of certification, and should refer all cases to the board of three for decision, and that they should be both the certification and referee body?—I quite agree with that in those places.

1804. I understand that in New South Wales there are no statutory regulations in connection with lead manufacturing in and around Sydney?—There are not any laid down by Statute, but they are under arbitration awards.

1805. We were informed yesterday that works managers have no statutory powers to make men take certain precautions?—In many industries they certainly have not.

1806. What is your opinion in regard to Port Pirie in view of the facts as we have given them. Should statutory regulations, binding the company for the removal of dust as far as possible and the men in the taking of precautions, be issued in regard to a big industry like that of smelting lead products?—I do not think that that is absolutely necessary.

1807. Why is that?—I do not think you want to enforce them necessarily by an Act. All the powers should exist under the Health Acts, and these should be carried out.

1808. Do you think they should be made statutory regulations under Health Acts?—I do not believe in statutory regulations. I think you may get general powers and make regulations under those powers.

1809. Would you give inspectors power to insist on whatever is necessary both in regard to the company and the men?—Yes.

1810. And this disease should be made notifiable?—Yes.

1811. Should such a board of three medical men, as we have been discussing, have the power to order sufferers to undergo treatment either privately or in hospital?—Yes; they should have power to call a man up from time to time to report for examination.

1812. Should this board have power to call for treatment reports from doctors and officers concerning cases that are receiving compensation?—I would not say that that should be compulsory.