for it. For this salary he has not to work eight hours a day for six days in the week, but every day in the year, and even every hour in the day he is bound to be ready to take up his heavy burden. Other men have, with Sundays and public holidays, about two months in the year for rest and recreation; for the unfortunate lodge doctor there is no provision for a holiday annual or otherwise. The inevitable breakdown in health which must follow such a service makes it dear at any price. We feel that we are right in advising men against selling themselves into such slavery; for

> "There is a tide in the affairs of men,
> Which taken at the flood leads on to fortune;
> Omitted, all the voyage of their life
> Is bound in shallows and miseries."

A PLEA FOR PAINTED RAILINGS AND PAINTED WALLS OF ROOMS AS THE SOURCE OF LEAD POISONING AMONGST QUEENSLAND CHILDREN.

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I HAVE had recently under my care four fresh cases of the very definite condition which I described* as "ocular neuritis, simulating basal meningitis—plumbism." The appearance of so many cases at the same time, all of them fairly severe ones, though fortunately not of very long standing, and all of them cases which, in my opinion, would have suffered from permanent blindness unless removed from their surroundings, and possibly also unless treated, again called my attention to the question of source.

Although efforts to discover the source of the lead poisoning have hitherto been unsuccessful it has been apparent to those of us interested in the question that the source of the lead is available to almost all Queensland children who live in towns, and certainly to all the children of an affected family, even although one only showed symptoms of poisoning. We† explained the fact that one member of a family is often selected and the others are apparently unaffected, by the fair assumption that the lead was injected in very small quantities only, and that only children idiosyncratic to lead showed symptoms of poisoning. We pointed out, however, that often other children of a household showed a blue line on the gums, indicating the presence of lead circulating in the blood, but not in sufficient quantity to cause the distinctive poisonous symptoms.

It is known that lead when it gains entrance to the body is very slowly excreted by the kidneys, and in some undoubted cases of lead poisoning the Government Analyst has failed to find it in the urine, while finding it in other cases exhibiting absolutely identical symptoms. This lent colour to the belief that defective excretion in some children was a reason for their selection as those showing poisonous symptoms. I hope to-night to furnish a better explanation than idiosyncrasy for the selection in a family of victims to lead, and also to get rid of the idea that only small quantities are ingested. Shortly, I am able, I believe, and advance a very strong plea for painted walls and railings as the source of the lead, and for the biting of fingernails or sucking of fingers, as in a majority of cases, the means of conveyance of the lead to the patient. My own personal experience is now, of course, confined to the cases exhibiting eye symptoms unaccompanied by other paralytic symptoms; but I am quite satisfied that except in isolated cases the source of the poison is the same in all Queensland children affected. It is possible that some of you have long recognised paint as a source. To my shame, I cannot remember to have done so, and I cannot remember to have ever heard it discussed as a source, or even seriously stated to be one. Mr. Henderson, the Government Analyst, says that he suggested it, but that the idea was pooh-poohed.

The four cases, all in young children, all exhibiting the same ocular signs, hardly even differing in degree, have recovered so completely and so quickly that although I showed three of them at last meeting, in onlyone was there remains of a previously intense double optic neuritis, and in only two was there a very slight remains of paresis of an external rectus which had been paralysed. I was able to show the elder brother of one case who, while not presenting any of the paralytic symptoms of lead poisoning, shows a peculiarly distinct blue line in the gum completely surrounding one of his posterior molars. The clinical picture presented by these cases is a very definite one, and one which I have not seen described in its entirety except in my own paper. The symptoms are sudden onset, with or without preliminary colic, vomiting, or malaise, and with or without

* *A.M.G.*, 1897, page 479. † A. Jefferis Turner, *A.M.G.*, 1897 page 475; J. Lockhart Gibson, *ibid.*

retracted head and acute pains in the back of the neck, of paralysis or paresis of one or both external recti, accompaned. by optic neuritis or choked disc, so intense that any medical man at all acquainted with the appearance of a normal disc would recognise it at once. The swelling and consequent advancement of the disc in all cases most distinct, and even the surrounding retina often swollen and advanced. I called the condition *ocular* neuritis, because no case of the many I have seen has the optic neuritis existed without paralysis of an external ocular muscle; in only one case where one muscle only was paralysed was it other than an external rectus. In very severe cases the other external ocular muscles are paralysed. These have been cases of some standing, and have resulted in blindness. The cases, excepting the very severe ones with pain in the neck muscles and retracted head, are often hardly unwell, and have no temperature. As a rule the internal squint disappears before the optic neuritis. The squint is always recovered from, even when the retro-bulbar neuritis results in atrophy and blindness. The cases do not die if removed soon enough from their homes. The oldest of the four cases admitted to the Children's Hospital in January is eight years, the youngest two years. In the urine of the two of the four, E.M., aged eight, and E.B., aged two, the Government Analyst found lead ·4 milligrammes per litre in one and ·32 milligrammes per litre in the other. A second sample of E.B.'s urine sent to the Analyst when recovery was nearly complete yielded only a trace, 1 milligramme of lead per litre of urine. The two other cases gave no lead in the urine submitted to the Analyst. I am of opinion that the Government Analyst has proved that the water from galvanized iron tanks may be excluded as a source of the poison, and that abundant observations have proved that the presence of metallic zinc in the water precipitates any lead which may get into the tank. The fact that the Analyst was able to find lead in three specimens of tank water prior to my former paper is capable of explanation. It appears that neither lead carbonate nor zinc carbonate is soluble in pure water, carbonic acid must be present, but it always is present in natural waters. Only the presence of metallic zinc in the tank deposits lead from its solution, the equation being, according to Mr. Henderson, as follows:—

$$Pb\,CO_3 \times CO_2 + Zn = Zn\,CO_3 \times CO_2 + Pb.$$

He states that the oxide of zinc which forms upon and covers insides of galvanized iron tanks is so porous that it does not prevent the contained water from coming into contact with the metallic zinc underlying it.

In weighing evidence in favour of any source we must bear in mind that it is some source available to a majority of Queensland children, except the very poorest, who live in towns. Paint occurred to me as a possible source. I took it as a hypothesis and have endeavoured to get facts to prove the hypothesis correct. In this there has been no element of taking the cart before the horse, but perhaps more apparent than real. It will be convenient to state the evidence in support of my hypothesis in as tabulated a form as its nature will admit.

1. A majority, probably all the children we have observed affected with lead poisoning, have lived in houses whose rooms have been painted, or at least whose verandah railings have been painted. All four children under discussion have done so. The children of school age who may not have had much opportunity of contact with painted walls and railings at home have opportunity at our public school buildings.

2. Two conditions of painted surfaces would be more than usually liable to induce poisoning, viz., (*a*) freshly painted or at least sticky surfaces; (*b*) painted surfaces which have either been exposed to the sun and air, and whose paint has lost its oil and become a dry easily detachable powder, or which though not exposed have lost some of their oil and gloss, and which when rubbed yield a powdery substance to the touch and possibly distribute it to the dust of rooms. Dust, of course, is capable of being both swallowed and inhaled. A greater danger, however, is adhesion of the paint either by nature of its stickiness or by nature of its powdery character, and fingers and nails by which it is carried to the mouths of children, especially in the case of those who bite their nails, suck their fingers, or eat with unwashed hands. A further danger worthy of consideration is absorption of the very soluble lead salts contained in paint through the skin of children's hands and feet. The sweat moistened skin in summer would render this method of absorption more likely. We must remember that arsenic poisoning has been proved to occur by absorption of powdered arsenic through the skin. In considering lead detachable from walls of rooms and from

verandah and other railings, as a possible cause of lead-poisoning, we have a very complete parallel in the at one time pretty common and well recognised poisoning by arsenic from the powder distributed to rooms by green wall-papers.

3. To ascertain whether the powdery substance so easily detachable from painted surfaces which have been exposed to the weather was or was not composed largely of lead, I supplied the Government Analyst with two pieces of calico, each about a foot square, which had been rubbed against such verandah railings. I asked him, 1st—How much lead is present on one piece of calico? 2nd—Is the lead on the other piece in an easily soluble form? Answers:—1st—The total lead on one of the pieces of calico was 0·3 grammes, equivalent to 0·375 grammes of white lead. It probably existed in the form of the very soluble hydrated carbonate. 2nd—Eighteen square inches from the centre of the other piece of calico were soaked in distilled water for 24 hours. This treatment dissolved practically the whole of the lead. No attempt was made to keep carbonic acid out of the distilled water, as it is present in all natural waters.

4. The child, E.M., whose brother shows so marked a blue line on his gums, but no paralytic symptoms, lived until December 5th in a house whose rooms were not painted, and whose verandahs and verandah railings had been so long unpainted that the child's mother says there was really no paint on them. They moved to their present house on December 5th. The child became ill on December 14th, or between that and December 18th, with colic or vomiting. A squint was noticed at about the new year, and double vision, of which I shall have more to say at another time, as it was monocular. She was brought to the Children's Hospital on January 7th. The house they moved into had been painted recently, and they were its first occupants, and the smell of new paint was very distinct. The walls were sticky. The smell has now disappeared, and there is no longer stickiness. It will be freely admitted that walls still sticky with paint would contaminate the hands of a child very readily, and that the likelihood of such hands being carried to the mouth would be very great. When explaining this idea to the mother she said, "*And those are the only two of my children who bite their nails.*"

The child, E.B., aged two years, had not, of course, been to school. The source of the poison was to be looked for, therefore, in his own house or surroundings. He had lived up to the time of admission to the hospital in a house which has remained unoccupied since his father left it in the end of January. I obtained leave to visit this house, and invited Mr. Henderson to accompany me, which he was kind enough to do. Our object was to obtain evidence as to whether lead was to be found in the dust of the room chiefly occupied by the boy, and whether the walls of the room yielded powder of lead, which was easily detachable. The house was completely painted throughout, and had evidently been painted for fully three years. The *verandah floors* were all painted as well as the railings, and there was painted lattice work around part of the verandah. The house, in fact, formed a simple lead trap, provided the paint was detachable and evidence could be obtained of its conveyance to the patient.

The paint in the room, and indeed in all the rooms, was in good condition, having a polish on it on walls and ceiling. The floor of the room was painted for a breadth of some two feet at its margin. The verandah floor was completely painted, and here the paint was dried and powdery on the surface. Pieces of calico cloth, 9 in. x 4 in., were used for rubbing the ceilings, walls of the room, painted floor margin, and verandah floor. They were rubbed firmly on the painted surfaces; Mr. Henderson says, vigorously.

There was not much dust in the room, which had evidently been well cleaned out before the house was vacated. Samples of dust were carefully brushed off ledges into watch-glasses with a camel's-hair brush, to avoid dislodging the paint.

Analysis of calico cloths and of the dust samples gave the following result:—

1st.—From the cloth rubbed on the ceiling whose paint was very glossy and showed no signs of wear and tear, no lead was obtained.

2nd.—From the cloths rubbed on the walls where the painted surface showed signs of wear and tear, 2 milligrammes of lead carbonate were obtained.

3rd.—A similar quantity of lead carbonate was obtained from the cloth rubbed on the painted floor margin.

4th.—From the cloth rubbed on the verandah floor 12 milligrammes of lead were obtained.

5th.—Dust.	Weight of dust.	Lead Carbonate found.
(*a*) From top of moulding above the door	·2 grammes	1·5 m. gram.
(*b*) Top of fanlight facing side verandah	·25 grammes	Nil
(*c*) Top of door facing front verandah ..	·25 grammes	0·2 m. gram.
(*d*) Top piece of venetian blind	·32 grammes	Nil
(*e*) Top of skirting near door and side verdah	·2 grammes	Nil

A very important observation on the house was the following:—The day was a very warm, oppressive one. My hands were moist with sweat, and I noticed touching the walls with my fingers always brought off a stain of paint, and that it came off much more noticeably on my fingers than upon the calico cloths. This can be demonstrated by anyone on moist painted surfaces that have been painted for any length of time.

The child, E.B., aged two years, who lived in this house, does not bite his nails nor suck his fingers, but he spent his days with bare feet on the painted verandah floor, whose painted surface was so powdery and easily detachable. His father tells me also that he was very fond of standing grasping the verandah railings and placing his face against and his nose through them. Their paint was powdery and easily detachable. The child is in the habit of putting everything into his mouth, and he may have sucked the verandah railings. No doubt his hands were often on the floor as well as on the rails, and no doubt also he carried them sometimes to his mouth. It is possible that some poison may have been absorbed from the verandah floor through the skin of his feet or through that portion of the skin occupied in sitting.

It will be seen, therefore, that there is an intermediate state of painted walls and railings where the danger of lead being distributed from them to occupants of a house is comparatively non-existent, viz., the stage between the stickiness of comparatively new paint and the powdery or semi-powdery condition of old paint. While the paint after ceasing to be sticky has remained glossy, the danger of lead contamination of hands would be expected to be very small, and the state of the ceiling in E.B.'s room confirms this view. The walls of the same room, which showed more exposure to wear and tear, and which had to some extent though not very markedly lost their gloss, contaminated my fingers very decidedly, and calico cloths rubbed upon them only less decidedly.

6. Upon learning from the mother of E.M. that the only two of her children who showed marked signs of the presence of lead in their systems bit their nails, I made further enquiries to see whether other cases did so also. I found that the two other girls who, with E.M. and E.B., were the immediate cause of the present enquiry, also bit their nails badly; also that another inmate of the hospital suffering from the arm and leg form of lead palsy, sucked her thumb. I then asked the resident surgeon, Dr. Lucy Gullett, to communicate with the parents of a number of undoubted lead cases and ask if they bit their nails. She obtained ten answers to twelve post cards, and of these eight bit their nails or sucked their fingers. Two were said to do neither. Several colleagues who have been kindly making enquiries from their lead patients have found that a large majority bite their nails or suck their fingers.

The ready adhesion of paint to my sweat moistened fingers made me ask Dr. Gullett to look up the hospital records for some years, and ascertain whether cases of lead poisoning were more frequent in summer than in winter. I thought it likely that an affirmative answer would favour the conclusion that paint is the source. It was found that from 1898 to 1903, viz., six years, 85 *cases of lead poisoning* had been treated as in-patients at the hospital; that of these, 42 were admitted during the months of December, January and February, our hottest months; that 28 were admitted during October, November, March and April; and that 16 only were admitted during the five cooler months.

In a house to which I had been taken by Dr. Salter, who had been much interested in the lead question, but whom I have not quite converted to my view, it seemed to me that valuable evidence was obtained of the method by which poisoning occurs. White painted railings and a white painted gate, from which the paint was readily detachable as powder, separated a small garden from the street. The sitting-room and back verandah were painted; there was a very narrow painted verandah passage having some sharp turns in it leading to some back verandah stairs; at each corner the paint showed marked signs of rubbing at the height where the children's hands would come into contact with it when going smartly downstairs. One of the affected children in this household sucked

her thumb. She has had repeated attacks of lead poisoning, occurring always in the summer months.

The point most emphasised regarding treatment in my last paper was removal of the cases from their homes. I have been accustomed to put those who have eye symptoms, and who come under my care in bed, to inject pilocarpin daily for six weeks to the extent of causing diaphoresis, and to give iodide of potash. The pilocarpin I have given in the hope of relieving tension in the optic nerve sheath, and I should be disinclined to discontinue its use. Still, I am convinced that removal of the cases from their homes to the hospital is more important than anything.

The fact that arms and legs are affected in some cases, and that ocular neuritis occurs in others, and that seldom or never are the two conditions coincident, shows that different parts of the peripheral nervous system are susceptible in different children, and makes one hesitate to exclude personal susceptibility or idiosyncrasy from playing a part in determining the victims to lead in any special family. Still, if my contention to-night be correct, the children have an abundant supply of lead available, and do not require to be idiosyncratic to it.

Although not averse to leading a crusade against the semi-vandalism of covering the prettily grained pine linings of our houses with paint, I am glad to think that the apparent fact that most of the cases bite their nails or suck their fingers will give us help in at least preventing the frequently recurring attacks which the ordinary lead cases get, and will enable us also to educate the public in the matter of prevention of primary attacks.

I have until now been in the habit of saying to patients' parents, "You had better avoid tank water for drinking purposes"; but I do not know the source of the lead—I only know that lead is the cause of the affection. I shall henceforth, unless I am offered a better explanation, blame paint.

(Read before the Queensland Branch of the British Medical Association.)

A Hospital Portrait Gallery, Brisbane.—Some years ago, while medical superintendent of the hospital, Dr. E. Sandford Jackson set himself to collect photographs of persons who were identified with the early history of the institution, and he has lately presented the result of this collection, together with a number of groups marking the growth of the nursing staff, to the committee, in the hope that these may form the nucleus of a substantial collection in the future.

A CONTRIBUTION TO THE STUDY OF NEOPLASMS.

By Arthur Styles Vallack, M.B., Ch.M. (Syd.), Bowral, N.S.W.

Of all the problems which confront medical science at the present day, probably none has excited a more general interest, either amongst the medical profession or amongst the general public, than that presented by the causation of cancer. The amount of research work done in recent years in this connection has been enormous, and in many countries patient and competent workers have expended much time and labour in attempting to throw some light upon the matter. But, though the results of their activity have been both interesting and valuable, we seem to be as far off as ever from arriving at any general consensus of opinion. Speaking broadly, the various hypotheses which have been brought forward to account for the origin of malignant growths divide themselves into two groups, viz., the parasitic and the developmental. The former regards the excessive cell growth as stimulated by irritation of the cells due to some living parasite introduced from without; the latter regards the process as due to some intrinsic perversion of the reproductive function of the cells themselves.

Of late the mind of our profession seems to be obsessed by parasites. We live in the age of microbes. The only explanation of any morbid phenomenon which appears to us in any way complete or satisfactory is that provided by the discovery of a living *causa causans*. Indeed, it is only natural that this should be so. It is not long ago since the etiology of tubercle or malaria was as obscure as that of gout or epilepsy. Unquestionably, bacteriology has done far more to place our art upon a scientific basis than any factor which has operated within recent years. Is it any wonder, then, that the pathological dove, after hovering long over the troubled sea of ignorance and doubt, longs to find a secure resting-place for her foot upon the back of a bacillus or the pseudopodium of a protozoon? It appears to me that this bias has at times had the effect of narrowing our conceptions of disease in general. We focus our gaze to the twelfth-inch oil immersion, when by putting away the microscope and stepping back a few yards we might get a much more comprehensive and enlightening view. Perhaps in no field of observation and research