SESS. II.—1891.
NEW ZEALAND.

THE HANMER PLAINS SANATORIUM

(REPORT ON PRESENT CONDITION AND FUTURE PROSPECTS OF), BY A. GINDERS, ESQ., M.D., OF ROTORUA.

Laid on the Table of the House of Representatives by Leave of the House.

SIR,— The Sanatorium, Rotorua, 31st August, 1891.

I have the honour to report that, in accordance with your instructions, I left Rotorua on the 13th ultimo, in order to visit and report on the Hanmer Plains hot springs, and their surroundings. I arrived there on the 23rd ultimo.

The route is from Christchurch to the railway terminus at Culverden, a distance of sixty-nine miles, and thence by coach to Hanmer Plains, a distance of twenty-four miles. The journey is accomplished in ten hours, allowing an hour at Culverden for luncheon.

The physical features of the country passed through are in marked contrast to that of the North Island. The level alluvial plains of Canterbury, dotted with smiling homesteads, and bounded only by bold snow-capped mountain-ranges, form an agricultural paradise when compared with the rudely broken and barren areas of the North. Nor are the geological features less remarkable and distinct. Isolated volcanic cones and igneous rocks cropping out in every direction are conspicuous by their absence, and are replaced by sedimentary formations, chiefly sandstones and clay-slates.

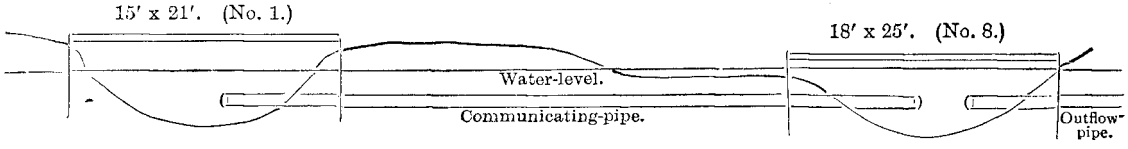
I interviewed the hotel-proprietor at Culverden, with a view to getting some knowledge of the extent of the tourist traffic between that place and the Hanmer Springs. He informed me that the two coaching establishments were fully engaged during the season; that the boarding-accommodation was frequently overcrowded, and failed to meet the demand, visitors having frequently to wait a week or ten days before they could secure a bed; and that the distance between the hotels and the springs was a serious inconvenience to invalids.

The coach-road to Hanmer crosses the Culverden Plains, thence along the valley of the Waiau River, until the Waiau Gorge is reached, near the position of the old ferry. This gorge is now crossed by a handsome viaduct, which leads into a rocky cutting—a work of considerable magnitude—emerging from which you enter the Hanmer Plains. The twenty-four mile drive is accomplished in three hours, thanks to the excellence of the roads, which are well formed and maintained, and no doubt at a very moderate cost, as the bed of the Waiau River furnishes, and will continue to furnish, shingle enough to keep it in repair until the crack of doom. The winter landscape presented by the Hanmer Plains is very magnificent. A complete amphitheatre of mountain-ranges, snow-clad from summit to base, with here and there a lofty peak rising to an altitude of from 2,000ft. to 3,000ft., each with a history accounting for its name—Mount Percival, Mount Captain, Mount Ethel, Mount Isabel, &c. The loquacious coach-driver will tell you how a certain Mr. Anderson rode his horse "Captain" to the summit of the loftiest peak of that grand amphitheatre, and, believing in Nelson's motto, *Palmam qui meruit ferat*, preferred to immortalize the name of his horse rather than his own. In these days of self-aggrandisement, of personal log-rolling, and individual axe-grinding this story is refreshing.

The Government reserve at Hanmer Plains is four square miles, four miles long by one mile in width. Part of this is leased to the proprietor of Jollie's Pass Hotel, and part to W. A. Low, Esq., of St. Helen's, a gentleman whose residence is within a mile and a half of the springs, and to whom I am indebted for much valuable information and courteous hospitality. The springs themselves, with their appurtenances, are comprised within an area of 5 acres on the north side of the plain, and are at an elevation of 1,200ft. above sea-level—Dr. Hector says 1,360ft. This area has a seven-wire fence round it, within which is a well-grown and neatly-trimmed *Cupressus macracarpa* hedge, and a triple row of ornamental trees. The ground is grassed, and laid out in walks and flower-beds. A plot of 10 acres adjoining the bath enclosure is cultivated by the custodian, Mr. John Rogers; he has 5 acres of grass and 5 of oats, and is able to keep a cow and a horse. The neatness, order, and cleanliness of the entire establishment do Mr. Rogers the greatest credit.

The springs are ten in number; their chemical character analysis shows to be one and the same, the fixed salts in each varying slightly in quantity but not in quality. Nos. 5, 6, 9, and 10 are cold, and, having no outflow, are valueless. Nos. 2 and 3 are small holes without overflow, having temperatures respectively of 94° Fahr. and 114° Fahr. Nos. 1, 8, 4, and 7 are the springs utilised. Nos. 1 and 8 are converted into tanks, having the respective areas of 15ft. by 21ft. and 18ft. by 25ft.; they are connected by a 3½in. galvanized-iron pipe, after the manner of the subjoined

sketch, and give the total supply of hot water used in the baths, equivalent to about 25 gallons per minute, which runs to waste eighteen hours out of the twenty-four.



Difference of water-level in the two tanks, 18in. To increase the capacity of No. 8 by 1ft. in depth would give 765 cubic feet more water, or 4,688 gallons. To increase the capacity of No. 8 18in., both tanks would stand full, giving 7,032 gallons extra.

No. 7 is a circular pool some 25ft. in diameter, enclosed by a corrugated-iron fence, and used as a swimming-pool. Its temperature varies, usually about 80° Fahr., but sometimes cold. There are five dressing-boxes connected with it. No. 4 is a round open pool some 15ft. in diameter, also fenced in with corrugated iron. The water has a temperature of 83° Fahr., and is used for cooling the supply from Nos. 1 and 8. It is the only mineral water available for the purpose. Its outflow is not allowed to run to waste, but is drawn upon as required. The supply, however, is very limited, frequently failing in summer to yield the necessary daily quota of 4,500 gallons. In any future scheme of improvement this fact will require some consideration.

On the five-acre enclosure stand three buildings—the bath-keeper's house and two bathing-pavilions. The old pavilion contains four baths, each 9ft. by 2ft. 6in. Each bath is provided with a cold shower, and each will accommodate two bathers. The bottom of these baths is 5ft. below the surface, to allow the access of the water by gravitation. The new pavilion contains eight baths, also provided with cold showers; these baths are 6ft. by 2ft. Here screens are much needed, to prevent the shower-water from splashing over the room. In this pavilion there are two waiting-rooms—mere closets, ridiculously small, uncomfortable, and inadequate. The bath-keeper's house contains two bedrooms, a kitchen, and a sitting-room, but, as he is Postmaster of the district, his sitting-room is taken up by postal requirements, so that he is greatly cramped for room. The washing of towels, &c., is, of course, very considerable, and his wife very reasonably complains of having to wash out of doors in the cold winter weather. An outhouse is urgently needed.

The prevailing wind is from the north-west—a warm wind, which has the effect of cooling the springs slightly; but on the whole neither wind nor season make much difference either in temperature or outflow. In a non-volcanic district this is what might be reasonably expected, the springs rising most probably as natural artesians from a great depth. The south-west is the rainy quarter. The snow remains on the hills for eight months in the year. The earthquake which occurred on the 1st September, 1888, appears to have had no effect whatever on the springs, either as to chemical constitution, temperature, or outflow; neither was any injury done to the bath-buildings. The effect of the Tarawera eruption on the Rotorua Springs was to increase both their temperature and outflow—a most fortunate result, as such seismic disturbances not unfrequently cause the total disappearance of thermal springs.

The statistics of these baths for the last three years are as follows: Number of baths taken for the year ending 31st March, 1889, 4,277; year ending 31st March, 1890, 5,665; year ending 31st March, 1891, 6,433. Revenue for the three years respectively, £136 16s., £208 8s., and £228 12s. 6d. The money is paid into the Public Account, and the bath-keeper's salary is £200 per annum, of course, including his wife's services as female bath-attendant. Thus it appears that an annual increase of 20 per cent. may be expected for the next few years, whether additional accommodation is afforded or not. The charges for the baths are 1s. for a single bath, or twelve for 8s. Some complaint is made that these charges are too high for the poorer class of patients.

Let us next consider what amount of bathing-accommodation these springs are capable of affording. We have seen that the total supply of hot water from springs Nos. 1 and 8 is equal to 25 gallons per minute, or 36,000 gallons in twenty-four hours. There are twelve baths, which, reasonably filled—say, to a depth of 18in.—will draw upon the supply as follows: Eight baths, each 6ft. by 2ft. by 1ft. 6in. = 144 cubic feet; four baths, each 9ft. by 2ft. 6in. by 1ft. 6in. = 135 cubic feet: together, 279 cubic feet, or 1,709 gallons, required for one filling of the twelve baths. Say they are filled seven times daily, equal in round numbers to 12,000 gallons. The water from springs Nos. 1 and 8 will average a temperature of 115° Fahr. The temperature required for bathing is, say, 103° Fahr. The only water available for cooling is from spring No. 4, at a temperature of 83° Fahr. To obtain 12,000 gallons at a temperature of 103° Fahr. we require five-eighths of the quantity, or 7,500 gallons from springs Nos. 1 and 8, and three-eighths, or 4,500 gallons, from spring No. 4, thus: 115° Fahr. × 5 = 575 + 83° Fahr. × 3 = 824 ÷ 8 = 103° Fahr.

The baths are used six hours daily; and we have calculated for their being filled seven times in that period. Are the springs equal to this demand? The six hours supply at 115° Fahr. is 9,000 gallons; but, unfortunately, the cooler water at 83° Fahr. frequently fails in the summer, causing trouble and delay; otherwise the hot supply, as it stands at present, without conservation, is sufficient for three more baths—say, 1,446 gallons, which *plus* 7,500 equals 8,946 out of the 9,000. Practically, the bath-keeper finds that seventy baths daily are as many as he can give under existing arrangements. This he attributes to three causes, two of which, at any rate, are remediable: (1) The use by bathers of an unreasonable quantity of water; (2) remaining in the bath an unreasonable time; and (3) the failure of the cooling-supply. We see, therefore, that at present thirty-five invalids only can be provided with two baths daily.

The hotel-accommodation last season was for fifty visitors, which proved quite inadequate to the demand. Next season the two hotels will accommodate seventy—Jollie's Pass Hotel, three miles from the springs, fifty; and Jack's Pass Hotel, a mile and a half from the springs, twenty. Both proprietors are prepared to increase their accommodation to meet the demand. Their terms are two guineas per week for visitors of the first class, and £1 5s. for second class, with free buggy twice daily to the springs.

It is quite clear, therefore, that the boarding-accommodation is in advance of that for bathing, and that a cry for more baths will shortly be heard. The question is, How is this demand to be met? The only way I see out of the difficulty is to conserve the entire supply of 36,000 gallons, build a concrete cooling-tank of 1,000 cubic feet capacity, and double the number of baths. I have submitted these figures and queries to Mr. Malfroy for his opinion, which he has been kind enough to formulate in the following letter:—

Re HANMER PLAINS HOT SPRINGS.

SIR,—

In reply to your queries (and taking the figures quoted by you as to the discharge of springs Nos. 1 and 8 at 25 gallons per minute, and No. 4 at one-third of that, also the size, level, and respective position of the tanks, &c., as correct) I beg to state,—

1. Are the springs equal to the demand (viz., the filling of the present twelve baths seven times during the day of six hours)? Each filling will require 1,743 gallons, or a total of 12,205 gallons, being 7,628 gallons from Nos. 1 and 8 springs, at a temperature of 115° Fahr., and 4,577 gallons from No. 4 spring, at a temperature of 83° Fahr., to make the 12,205 gallons at a temperature of 103° Fahr. for the baths. The springs Nos. 1 and 8, at 25 gallons per minute, would give 9,000 gallons in six hours, and, estimating the supply derived from No. 4 spring at one-third, or 3,000 gallons for the same period, we have the 12,000 gallons required without any storage whatever. But, as the demand on the springs is irregular during these six hours, some provision must be made to store up 4,000 gallons to meet it and avoid delay.

2. As to the probable cry for more baths, and how the demand is to be met: The supply from Nos. 1 and 8 springs in twenty-four hours is 36,000 gallons, and, taking the supply of No. 4 at one-quarter of that, we have 45,000 gallons available during the twenty-four hours.* This quantity, properly stored and arranged that it may be readily mixed so as to reduce it to the required temperature, would be sufficient to provide 400 baths of 112 gallons each daily. This number of baths is not likely to be required for a considerable time. I would therefore suggest (provided the nature of the springs and surrounding ground will permit it) the rising of the level of No. 8 tank 1ft. 6in. higher than it is. This will give a depth or storage-room of 3ft. 6in. in No. 8 tank, and 2ft. in No. 1 tank, above the level of the outflow-pipe, equal to—storage-capacity of No. 8 tank, 9,843 gallons; storage-capacity of No. 1 tank, 3,937 gallons; natural flow of springs Nos. 1 and 8 in six hours, 9,000 gallons; natural flow of spring No. 4, 2,500 gallons: giving a total of 25,280 gallons available for baths during the time the baths are open; and, taking off the quantity required for the present twelve baths, seven times a day, eighty-four baths here before mentioned—viz., 12,205 gallons—will leave a balance of 13,075, representing 116 baths of 112 gallons each available for future requirements. If, however, the nature of the springs and surrounding ground will not permit of the rising of No. 8 tank as before mentioned the tank should be raised as much as practicable, and a storage and cooling-tank of about 10,000 gallons should be constructed in the best possible position to make up the quantity here before stated.

Having thus secured the required quantity of water, the next question is to provide baths, &c., to utilise it. (*a*.) We have already twelve baths, which, owing to their peculiar construction, cannot be used more than about seven times each bath during the day of six hours. This gives us eighty-four baths. (*b*.) I would recommend the erection of two wings to the present bath-buildings (as per sketch), providing in each wing one good-sized sitting-room in the front part, furnished with tables, chairs, couches, &c., and warmed in winter by a china stove in the centre of the room, and four private baths, with two dressing-rooms to each bath, one large public bath or piscine—like the Rachel bath at Rotorua—say, 10ft. by 12ft. by 2ft. 3in., with six dressing-boxes, at the back of each wing. Eight baths thus constructed, so that the person bathing occupies the bath only during the time of actual immersion, can readily be used twice during each hour, which for six hours gives ninety-six baths, consuming 10,752 gallons of water, leaving a balance of 2,322 gallons, which, together with the 20,000 gallons of natural unstored supply from the springs, would be available to occasionally renew and keep the water of the piscines at the proper temperature. I suggest this piscine or public bath, as I think it absolutely necessary to provide some cheap baths for people in poor circumstances.

As to the possible revenue, it would be—say, 180 baths (half at 1s. and half at 8s. per dozen), £7 10s.; two piscines (at twelve baths each hour in each piscine for six hours, 144 baths, half at 6d. and half at 4d. each), £3: giving a daily possible revenue of £10 10s., and a bathing-capacity of 324 baths daily, and a daily reserve of about 1,500 gallons of unstored water; and, if required in future, the ends of the new wings could be extended, and more baths provided, until the full capability of the springs is reached. As to the cost of the works, it is a matter which can be best calculated on the spot, but, considering that there is only one room in each wing to be finished inside, and that the remainder of the building would only be a shell, the cost should not be very great. But, whatever is done, I would strongly recommend the erection of the bath-rooms with two separate dressing-rooms. They are the kind generally used in the newest thermal establishments which I visited whilst in Europe, and possess the following advantages: The dressing-room gives bathers greater privacy to dress and undress, and security for their clothes and valuables. They can be kept clean and dry much easier, there being no splash or stain about them, as is the case when bath- and dressing-room are combined. The bath-room can be concreted all over, with the bath in the centre of the room, so that in the case of invalids requiring assistance the bath-attendant can circulate freely around, and render all assistance required. The bath-attendant having an independent access to the bath-room, he can immediately after the immersion is over set to work to empty, clean, and refill the bath, thus greatly increasing the number of baths to be taken within a certain period, without in any way intruding on the privacy of bathers; and, lastly, the bath being almost constantly in use, it acquires and conserves the temperature much better.

Dr. Ginders, Rotorua.

I have, &c.,
C. MALFROY.

These calculations, I think, give a fair idea of the bathing-accommodation which the Hanmer Springs are capable of affording. The expenditure necessary to carry out Mr. Malfroy's suggestions would, of course, be considered. The question is, Would such an expenditure be justified, or would the erection of a first-class hotel close to the springs be likely to prove a financial success? Some years ago an attempt was made to float a company, with a share-capital of £15,000, to build such an hotel. Very favourable terms were conceded by the Government for the lease of 150 acres; but, as only £2,000 of the necessary capital was subscribed, the thing fell through. One paragraph in the prospectus is amusing; it runs thus: "The Hanmer Springs are situated about 1,400ft. above the level of the sea, at which elevation a delightful, bracing atmosphere is enjoyed, greatly assisting the general health, and adding to the pleasure of the visitor, in striking contrast to Waiwera and Rotorua, which are situated in a *relaxing* climate," the difference of climate between Waiwera and Rotorua being really greater than that between Sumner and the Hanmer Plains. With the existing arrangements at Hanmer such an hotel could not possibly be a success. Already a reduction of the bath-fees has been asked for in the House of Representatives by the member for the district, and the two hotel-proprietors find it necessary to provide for a class of patients at £1 5s. per week, with free transit twice daily to the baths. The return fare from Christchurch to Hanmer and back—186 miles—is £1 10s.—less than 2d. per mile. The entire catering is in the interest of a class of patients

* It has been shown that frequently in the summer the No. 4 spring fails to provide the necessary quantity for six daily fillings of the twelve baths, although its entire yield is conserved; so that its daily product cannot exceed 4,500 gallons.—A. G.

who would not, or could not, patronise a first-class hotel. So without doubt the popularity of these springs is in a great measure due to cheap transit fares and hotel tariffs. This is an important consideration for those who think that such accommodation close to the springs would be likely to pay. They must take into consideration, also, the rapid increasing popularity of the northern springs—their unlimited supply and superior efficacy—with the prospect of through railway-communication with Auckland in the near future. I believe that, even if the extension suggested by Mr. Malfroy were carried out, the success of such an hotel would be highly problematical.

We shall now consider the Hanmer Springs chemically and therapeutically. As we have already stated, although there are ten springs, there is only one water; they are virtually one and the same. Two analyses of this water have been made. The latest I have just received from Dr. Hector, who was kind enough to cause an analyses to be made of a sample of the water which I carried with me on my return journey from Hanmer Plains. It is as follows:—

Analysis of Water taken from No. 1 Spring at Hanmer Plains.

Chloride of sodium	62·09
Chloride of potassium	0·15
Chloride of lithium	Trace
Iodide of magnesium	Trace
Carbonate of lime	0·55
Carbonate of magnesia	1·77
Carbonate of iron	0·05
Sulphate of soda	7·48
Carbonate of soda	2·66
Phosphate of alumina	Trace
Silica	2·63
Total grains per gallon	77·38
Gas—Sulphuretted hydrogen	2·19

The other analysis alluded to was made ten years ago, long prior to the earthquake which occurred in 1888, by Mr. Bickerton, of Christchurch. It is interesting from the fact that it includes an examination of the sediment and organic matter contained in the water. The sample was taken from spring No. 8 before it was incorporated with No. 1. It is as follows:—

Sediment—silica and free sulphur			1·400
Nitrogen as free ammonia	0·092		
" as albuminoid ammonia	0·048		
" as nitric acid	0·047		
Total nitrogen	———		0·187
Sulphuretted hydrogen, free	...		3·430
Sulphate of lime	9·940		
" potash	1·960		
" soda	0·400		
Bicarbonate "	7·770		
Chloride "	56·230		
Bicarbonate of magnesia...	0·640		
Total fixed matter	———		76·940
Total grains per gallon			81·957

The total amount of fixed salts in the two analyses correspond very closely. The sulphates and carbonates in either case are so small that the fact of their varying in the two analyses is a matter of no importance. The fact of the discovery of traces of iodine and lithium in the recent analysis is interesting.

The first fact to be observed is that this water is outside the category of waters suitable for drinking. The free and albuminoid ammonia (although derived from a vegetable source) is far in excess of what is considered safe in a potable water. They are, therefore, suitable only for bathing. Professor Hutton, in his article on the earthquake at Hanmer Plains in 1888 (vol. lxxxviii., page 270, of the "Transactions of the New Zealand Institute"), remarks, that a layer of black peat some 6in. or 7in. thick, with tough clay above and below it, underlies these springs at a distance of from 10ft. to 15ft. from the surface; that the free and albuminoid ammonia are derived from this peaty matter which the waters pass through, and that this organic matter reduces part of the alkaline sulphates to the condition of sulphides, which in their turn are decomposed by the action of carbonic acid derived from the peat, and changed into alkaline carbonates, with the disengagement of sulphuretted hydrogen gas. He thinks the passage of the water through the peat-bed is too rapid to allow the whole of the sulphates to be changed into carbonates; but that in all probability no carbonates and no sulphuretted hydrogen, and certainly no ammonia, exists in these waters below the peat-bed. He remarks, further, that these reactions do not give rise to sufficient heat to heat the water, but that it must be heated before it reaches the peat-bed. Surely, *cela va sans dire*, the chemical theory of thermal heat is pretty well abandoned. The Professor's conclusion, however, with regard to the origin of thermal heat in this district rather startled me. He thinks that, because these springs have no connection with volcanic agency, their heat is due to the crushing of rocks under the mountains. He admits that in all probability they rise as natural artesians from an enormous depth (according to experiments made by the German Government, probably 4,000ft.), why, then, should he object to attribute the heat to the inherent high temperature at that great depth?—a far more plausible theory, in my opinion, than either that of friction or chemical action. The hot springs of Thermopylæ, in Greece, resemble those of Hanmer Plains in this: that their chief ingredient is chloride of sodium, or common salt. What they were twenty-three centuries ago

—when Leonidas with his three hundred Spartans held that famous pass against the army of Xerxes —they are to-day. Their temperature is 149° Fahr. If for twenty-three centuries this heat has been generated by friction, due to the crushing of rocks, surely some great changes should have taken place in the physical geography of the country. One fact which I have not seen noticed with regard to the Hanmer Springs is this: that the gas disengaged by them is an inflammable gas, light carburetted hydrogen or marsh-gas (CH_4) probably. Considering the amount of free sulphuretted hydrogen shown in the analysis I was surprised to find the characteristic odour so slightly perceptible; it is no doubt destroyed to a great extent in the production of this gas. We know that when sulphuretted hydrogen (SH_2) is passed through decaying vegetable matter marsh-gas (CH_4) is generated by some such chemical change as this: $2\ SH_2 + C = 2\ S + CH_4$.

The water of the Hanmer Springs may be classed as a muriated alkaline saline, slightly hepatic or sulphurous. Used for bathing purposes only, what physiological effects may we expect from it? Patients who frequent our thermal springs are always anxious to see the analysis of the waters in which they bathe, and are usually under the impression that they absorb into their systems the entire list of salts enumerated. This is an error. The body cannot absorb any salts from an aqueous solution. If the water, or any portion of it, is allowed to dry on the skin a minute quantity of the constituent solids, of course, remains, which the friction of the clothing incorporates with the fatty elements of the integument, and is so absorbed. After a course of sulphur baths the underclothing is redolent of sulphur for some time after leaving the springs, and silver carried in the pockets continues to be blackened, showing that a considerable amount of sulphur has been absorbed in the manner described.

I have the addresses of a number of patients who are reputed to have been cured at Hanmer Plains of a variety of ailments, chiefly rheumatism in its various forms, and skin-disease in its protean manifestations. The question will naturally arise, How were they cured if nothing contained in the water was absorbed into the system? There are three factors concerned in such cures, which, in the order of their importance, stand thus: (1) Pure air, (2) mutual impression, and (3) hot water. The first of these items includes all the beneficial influences of change of climate, change of scene, and change of occupation, which means relaxation and rest. For a numerous class of ailments this curative influence is sufficient. Tardy convalescents from acute diseases, nervous exhaustion, and brain-fag due to business worries or long-continued emotional excitement, are cases for the cure of which the physician may confidently rely on this factor alone. To discuss the curative influence of mental impression would lead us far beyond the intention of this report; we know that it is potent both for good and evil; the business of the physician is to lead it in the right direction. Just as the hypnotist is able by suggestion to direct his patient's attention so forcibly to a diseased organ that its very nutrition is changed, so the individual, accordingly as he regards his case hopefully or despondently, may assist or retard his cure. The direct influence of hot mineral water used for bathing—apart from the effect of temperature—is twofold, according to its chemical character, either exciting and stimulating the cutaneous circulation, as in the case of acid sulphur waters, or exercising a soothing and emollient effect, as in the case of alkaline siliceous waters. The water of Hanmer Springs corresponds with neither category. It is an indifferent thermal water, too poor in chemical constituents to have any very decided character. I regard it as slightly stimulant. It may be useful in chronic rheumatism and atonic gout; in diseases of the skin, such as prurigo, psoriasis and lichen; in neuralgia and paralysis as the sequelæ of severe diseases; in hysteria, and in general weakness and marasmus. To old and prematurely old persons, whose nervous systems require rousing, I believe the baths and climate of Hanmer Plains will be of especial value. In all cases we must not lose sight of the fact that the skin is the most important emunctory of the body, and that, as a means of maintaining its normal functional activity, bathing, well advised and regulated, is the most efficient agent we can employ; and that in skin-diseases especially our cures are brought about not by any absorption of fixed salts contained in the water, but by the prolonged maceration of the cuticle, causing ready removal of the *débris* of dead and diseased cells, and their gradual replacement by cells of a more healthy character, due to the employment of a suitable regimen and the influence of a highly vitalising climatic environment.

During my visit to these springs I inquired carefully what complaints, if any, were made by invalid visitors with regard to the existing arrangements. They were two only: (1) The prolonged waiting for their baths in the uncomfortable closets set apart for that purpose, and (2) the absence of any medical advice as to how to make use of the water. Should the Government think well to carry out Mr. Malfroy's scheme of extension the first objection will be met. With regard to medical advice, if there were a variety of waters at Hanmer suitable both for internal and external use, not only would it be necessary to have minute analyses of the whole, checked from time to time by repeated chemical examination, but years of skilled medical observation would be necessary before a reliable code of rules and regulations could be formulated for their use. How different is the case when we have to deal with one water suitable for bathing only! The patient has no choice; he can scarcely make a mistake; and the water is of such a character that if it does no good it can hardly do harm. Thus, the necessity and scope for medical advice is narrowed down almost to a vanishing-point. It may not be out of place to give a few hints, even if in many cases they may be such as would be suggested by the patients' common-sense. Invalids suffering from skin-disease should, if possible, bathe twice daily, beginning with an immersion of half an hour at a temperature not exceeding 100° Fahr., and gradually increasing the time to three-quarters of an hour. If after a week's experience the baths increase irritation, and there is a general feeling of increased discomfort, with a more inflamed state of the skin, the baths should be discontinued, and another class of waters tried elsewhere. They should, if strength permits, walk back to their hotels rather than drive, in order not only to benefit by the exercise, but to minimise the risk of taking cold. The best season for such patients is the summer and early autumn. They may also bear in mind that medicines which may have done them no appreciable good at home may prove of service in conjunction with the baths and the changed character oi their surroundings. This advice applies equally to invalids suffering from the various forms of rheumatism. They

may take their baths at a temperature of 102° Fahr. to 104° Fahr.—the higher figure if pain is a marked symptom—the period of immersion not to exceed twenty minutes. As far as the use of this water is concerned, no distinction need be made between the three principal forms of chronic rheumatism—(1) Rheumatoid arthritis, with more or less enlargement and deformity of joints; (2) articular rheumatism, with no joint deformity; and (3) muscular rheumatism, which may not affect the joints in any way. The idea that gout and rheumatism may be associated in the same subject and called rheumatic-gout is generally abandoned. Gout is now regarded as a disease *per se*, due to secondary indigestion, or a failure on the part of the liver to convert the surplus albumen into normal bile acids and urea; an excess of uric acid finds its way into the blood and at once forms urate of sodium, a very insoluble salt, requiring from twelve to fifteen thousand times its own weight of water to dissolve it, whereas urea is soluble in its own weight. This salt is less soluble in lymph than it is in blood; consequently, where lymph predominates, as in the joint tissues, there this salt crystallizes readily, producing all the painful phenomena which constitutes an acute attack of gout. Rheumatism, on the other hand, is due to tertiary indigestion, or a failure on the part of the tissue cells to complete the final digestion of serum-albumen. In this case the crystallized urate of sodium may be deposited in the muscles or muscular interspaces, or pumped to the nearest joint. The liver has little or nothing to do with rheumatism; neither can cold, nor damp, nor depressing influences be ranked as causes; they merely develop the seeds of the disease already present in the system. Uric acid is the essential blood poison in gout, but in rheumatism there is something in addition, probably lactic acid. In its chronic form rheumatism is essentially the disease of old age and decay; the tissue cells have received a constant over-supply of albumen, usually from excessive meat-eating. It is uncommon either in its acute or chronic form amongst moderate eaters and vegetarians, and threatening attacks may often be warded off by a temporary recourse to a vegetable diet. We have no specifics in these days either for gout or rheumatism; every case requires to be treated on its own merits. It is the acquired or hereditary idiosyncracies of the individual that demand the attention of the physician rather than the disease.

There are certain forms of spinal paralysis so amenable to treatment by thermo-mineral baths that they are worthy of remark. The muscles of the lower extremities may be functionally separated from the spinal cord in a variety of ways. If by organic structural change in the cord itself they are usually hopeless; if by mechanical injury to a nerve (traumatic paralysis) they are often hopeful; and if by pressure of an effusion within the coverings of the cord, which may be either gouty, rheumatic, or syphilitic, they are—in young subjects especially—particularly hopeful. The diagnosis is not always easy; physical signs alone are not sufficient; perhaps the most valuable aid we have to correct diagnosis is the behaviour of the muscles under electric excitement. Such patients may bath twice daily, the period of immersion not to exceed half an hour, or the temperature 104° Fahr.

In cases of hemiplegia, where the leg has regained its power but the arm remains powerless, I have never seen any benefit derived from hot baths, and very rarely from electrical treatment. Cases of locomotor ataxy are not suitable for bath treatment. Sciatica and neuralgias generally will, I think, do well at Hanmer Plains; but in summer only. They may bathe twice daily, at a temperature of 102° to 103° Fahr., each bath not to exceed twenty minutes.

Cases of nervous exhaustion, brain-fag, tardy convalescense from acute diseases, general debility, hysteria, and other muriatic conditions must regard the baths as instrumental only in maintaining the skin in such a condition of healthy functional activity as will enable them to derive the full benefit from their surroundings. To this end, three baths weekly, at a temperature of 102° Fahr., for twenty minutes, will be sufficient.

The discovery of traces of iodine and lithium in the Hanmer Springs makes it a matter of very considerable regret that their internal use is interdicted by the quantity of organic matter they contain. Otherwise, in scrofula, gout, and rheumatism such a water should be of value.

I am not sure that we are justified in concluding that the organic matter can only have a vegetable origin. Wanklyn—an authority on the analysis of potable waters—tells us that when a water contains 0·08 parts per million of free ammonia it almost invariably proceeds from animal contamination; in fact, from the decomposition of urea; and that such water is usually loaded with chlorides. In the water under consideration, we have 0·09 in 70·000, a much higher proportion, also with chlorides as the chief ingredient. He states, further, that an absence of chlorides, with excess of albuminoid ammonia, characterizes water contaminated by vegetable organic matter. It is quite likely that in the past the aboriginal natives may have congregated in large numbers at Hanmer Plains, and that these organic impurities may really represent the skeleton of their sewage. I would strongly recommend that the organic matter in this water be again examined by Wanklyn's process, and reported on. I strongly suspect that some error may have crept in, which another examination may correct. It is also desirable that a much larger quantity of the water than I was able to carry down to Wellington (half a gallon only) should be concentrated, so as to enable the analyst to determine the iodine and lithium in figures.

Finally, I am informed that the inhalation of the steam given off by the Hanmer water is in great local repute as a remedy for bronchial catarrh. W. A. Low, Esq., of St. Helen's, informs us that when he suffers from this ailment he shuts himself up in one of the smaller bath-rooms, fills the bath with water at its full temperature of 115° to 117° Fahr., which quickly fills the room with steam, the inhalation of which gives immediate relief. It is an important fact to know that the gases given off by this water have a soothing rather than an irritating effect on the lungs; and, although it is not likely that patients will resort to Hanmer Springs for the relief of a common cold, it is desirable to ascertain by experiment how far this treatment will benefit the more chronic forms of bronchial irritation.

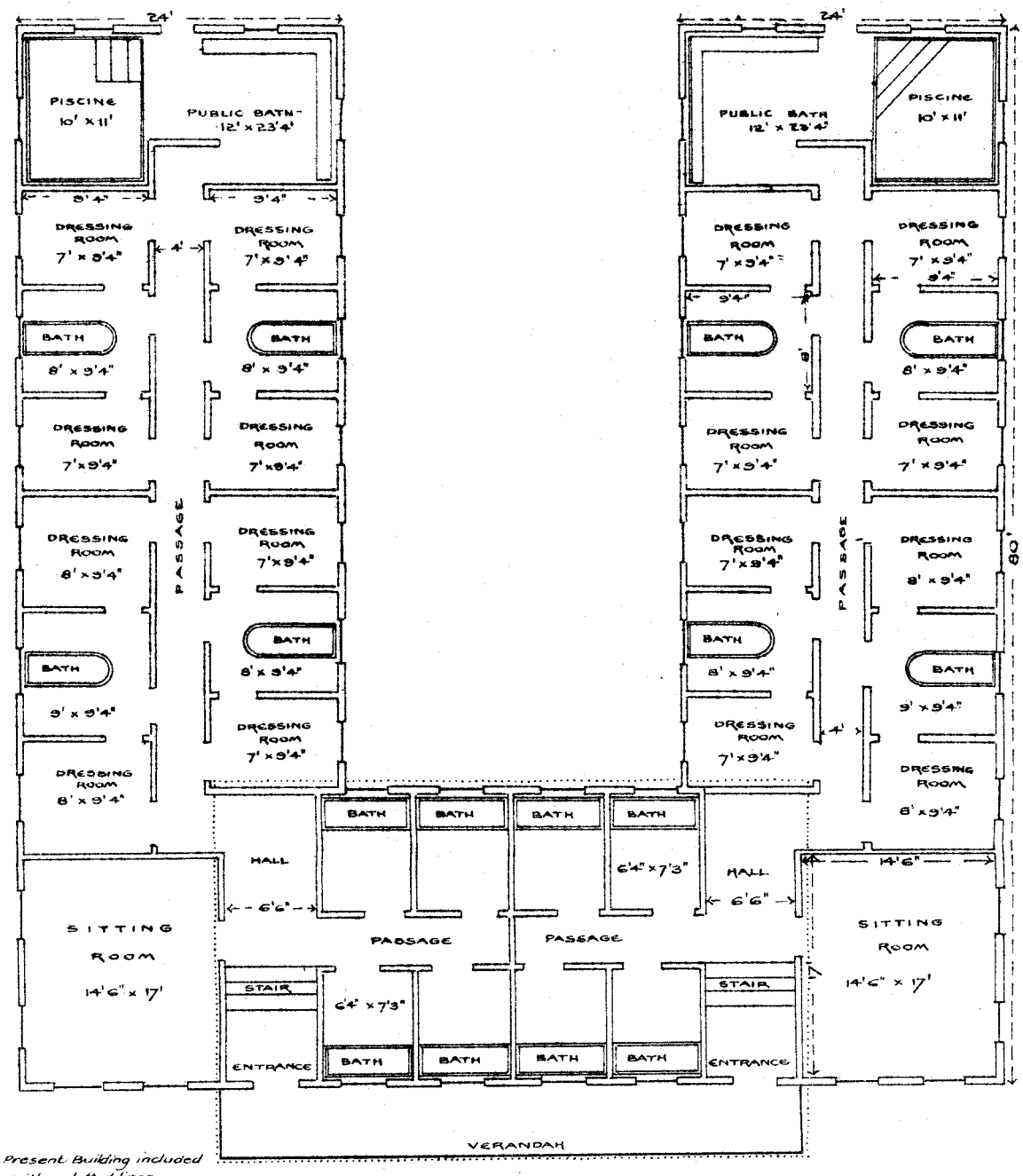
I have, &c.,

The Hon. A. J. Cadman, Native Minister, Wellington. ALFRED GINDERS.

[*Approximate Cost of Paper.*—Preparation, nil; printing (1,250 copies), £4.]

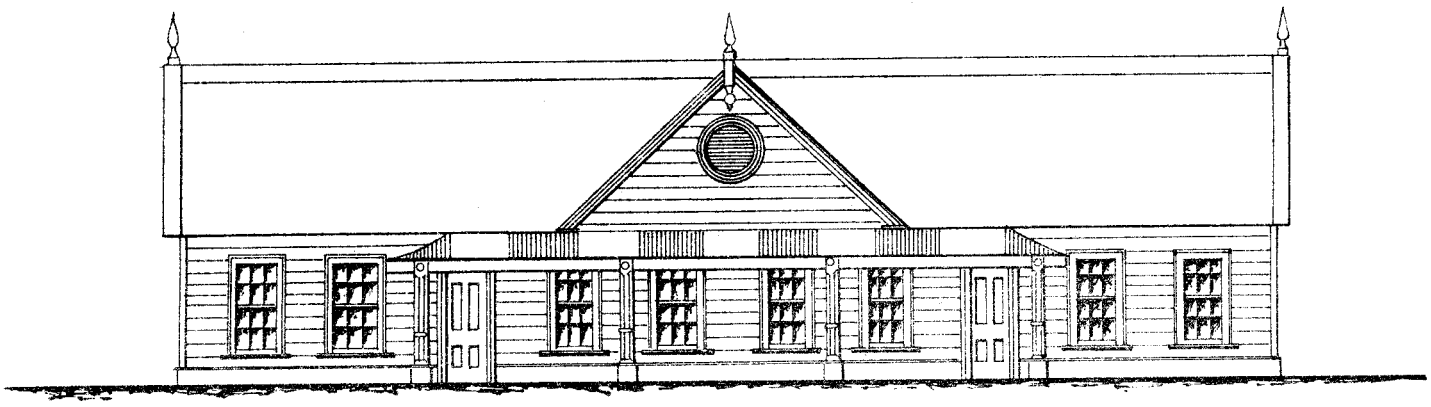
By Authority: GEORGE DIDSBURY, Government Printer, Wellington.—1891.

Price, 6d.]

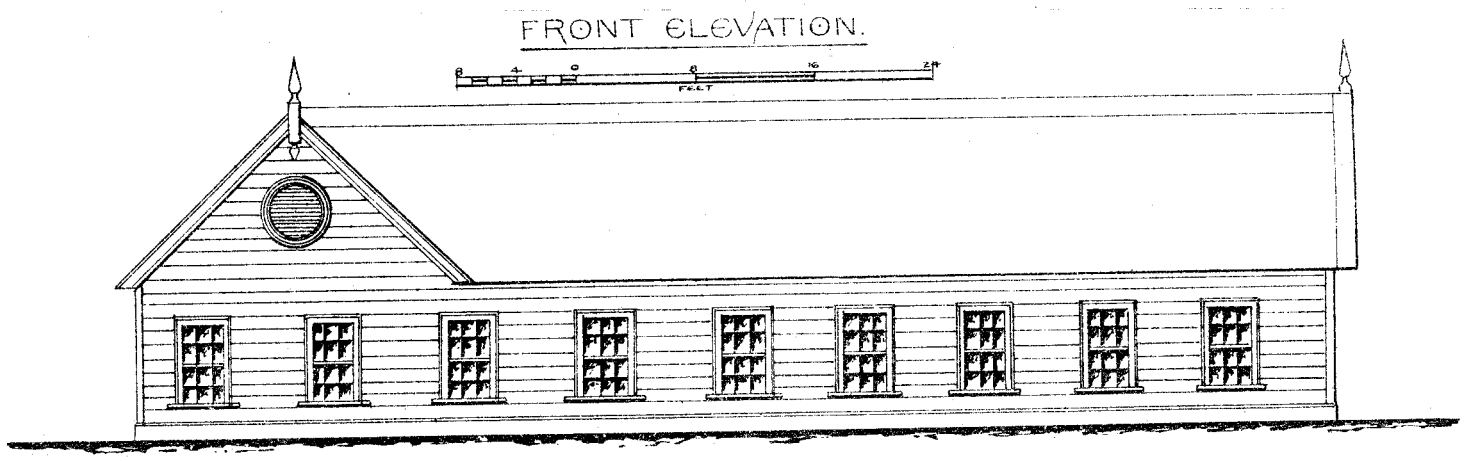


Note. Present Building included within dotted lines.

GROUND PLAN.



FRONT ELEVATION.



SIDE ELEVATION.

Plan of proposed additional BATH HOUSE FOR HANMER PLAINS.

Sd/ C. Malfrey
Rotorua, August 1891.