

THE HUMAN SIDE

The OT line epic is full of stories of human interest. Here are two personal stories, gleaned from their descendants; two illustrations of Todd's thoughtfulness and care for his men; and one sample of the esteem and affection which the men of the OT line had for their leader.

THE GRAVE OF CARL WILHELM IMMANUEL KRAEGEN

Deaths during construction of the OT line were remarkably few.

One of them - Carl Wilhelm Immanuel Kraegen - was in circumstances which occur only by sheer bad luck, and yet can so easily occur, even today.

It was in December in the searing, dehydrating red sandhill country south of Alice Springs.

As the year 1871 drew to close, the difficult centre section of the construction was almost complete. Kraegen, with two other telegraph operators, I.J. Mueller and R.C. Watson, left Charlotte Waters on horseback.

Their destination was Alice Springs, where they were to open up communication with Adelaide.

They had with them a map, showing the position of surface water.

Unfortunately, they became lost and, on the third day without finding water, only Kraegen had enough strength left to continue.

He went on, still looking for water.

Two days later, he had not returned to Mueller and Watson who, in their desperation, had shot one of their horses and drunk its blood. They had been 54 hours without water.

They were too exhausted to attempt to find Kraegen and went back.

Kraegen's body was found later near an angle pole three miles away from a well. He was buried on the spot, and a rough headstone was erected by the burying party.

Summer after hot summer, Carl Kraegen's grave lay unseen and unknown until, in 1962, it was discovered by his grandson, Mr. Frank Kraegen, of Sydney.

When Carl Kraegen died, he left three small children. His widow died shortly afterwards. She had, in fact, not heard of the death of her husband at the time of her own death.

The children (two girls and a boy) were brought up in an orphanage. The boy (Edward Charles) was self-educated. He became a telegraphist at Sydney GPO and, eventually, Commonwealth Public Service Inspector for New South Wales.

In 1926, Edward Kraegen went in search of his father's grave. He travelled by train to Oodnadatta and from there rode a camel. The search was unsuccessful.

But he did meet a travelling missionary who later saw the grave and sent back a picture of it.

This picture and the missionary's directions were the clues which led Frank Kraegen and his son John to the grave in 1962.

They travelled by four-wheel drive from Alice Springs and, with the aid of local aborigines, found the grave on Maryvale station.

The headstone, fallen over but still legible, was still there, along with bits of old pole, a broken insulator and some tangled wire.

The present generation of Kraegens are intensely proud of the part Carl Wilhelm Immanuel played in the OT line story.

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FIRST GENERATION DESCENDANTS

Direct links with the OT line construction are hard to find, as one would imagine after 100 years.

But two sisters - Mrs. Blanche Phillips, of Newcastle, and Miss Ruby Melville, of the Sydney suburb of Epping - are perhaps closer to it than anyone else.

They are first generation descendants (probably the only ones still alive) of a man who actually worked on the construction of the line.

He was David Melville who, in his early 20s, was recruited into the government party, led by Patterson, which went north to take over where Darwent and Dalwood left off. Mr. Melville died in 1946 at the age of 99.

Both ladies have clear recollections of their father talking of his work in the north. He was assigned to care for the cattle and sheep.

It was work he liked, Miss Melville said. In the long 220-mile trek south from Darwin to the point where work could be resumed, he preferred to let the animals travel in the early morning and early evening so that they could rest in the hottest part of the day.

Also, he liked to sing as he worked and would often come into camp singing right on nightfall with his weary cattle.

When the Wet came, Melville, who was in the party commanded by Walter Rutt, shared the discomforts of all the men in the north.

"The atmosphere in the tents was so heavy," Miss Melville said, "that the men would go outside, despite the torrential downpour, so that they could breathe more easily."

They spent the worst part of the Wet on a hill - Providence Knoll - surrounded by water. The animals, those that had survived, were with them.

When provisions ran short, David Melville, like many others became ill. Great sores developed on his legs.

"Then one day," Miss Melville said, "he walked into a lagoon where lilies were growing and plastered his legs with mud. To his surprise, the sores began to heal."

Miss Melville thinks to this day that there was some medicinal property in the water or mud of the lagoon.

It was, no doubt, Red Lily Lagoon, which is close to Providence Knoll.

David Melville was at Frew's Ponds when Patterson made the final join on August 22 1872. After the official messages were completed, every man was allowed to send a message home.

And it is from Miss Melville that we learn something of the celebrations that night at Frew's Ponds - how her father sang the song Ring the Bell Watchman which tells, in grand Victorian style, of a great deed being done; and how the "official party" came out of their tents to listen to him.

This is all we know of what happened at Frew's Ponds on that historic night. Patterson's diary, after the entry "We all adjourned to Frew's Ponds," has nothing more to say until 8.30 a.m. the next morning.

The sisters have many recollections of their father's talk about the days he spent working on the OT line - of the aboriginal boy who worked with him and called him Melborni; of the didgeridoo he learnt to play; of the reduced rations when provisions ran low; of mosquitoes; of swimming a flooded river to obtain writing materials so that he could write a letter home.

The only document they have is a small notebook which David Melville had with him in 1872. It contains, among other faded pencil entries, a list of aboriginal words he learnt, such as track, lost, food, water, fire - all words that he needed to know to survive.

THEN AS NOW

Hardly a year goes by even now without some people becoming lost in the Australian outback, often with tragic consequences.

Always the same warnings are again publicised. Stay where you are, and let the searchers find you. Light a fire if practicable.

This is sound bushmanship.

But it's not new.

Charles Todd, sending parties of men to work in a strange, harsh, unexplored land, gave explicit instructions on what a man was to do if he became lost.

"Most recorded cases of persons being lost in the bush show that they lose their presence of mind and frequently wander round, often coming back to the same place, so that their own tracks further confuse them," he said.

"The safest plan for a person to pursue, who is lost from a party, is, as soon as he finds that he is uncertain in which direction to go, to stop still, as he may be sure that people will be sent to look for him.

"If he has a match, he should light a fire on the highest place near him and keep it blazing until found."

A further instruction said that all men detached on service from the main camp should be provided with a compass and matches.

Directions for searching for a lost man were thorough and full of sound bushmanship.

THE RATIONS

How does one set about provisioning a large body of men to work for eighteen months in unknown country?

Men doing hard physical work. Men on the move. In a country that hits the intruder with heat, hardship and dehydration.

Charles Todd, in his careful and methodical manner, worked out an interesting scale of rations.

Per man per week, it allowed 9 lb. of flour, 1 lb biscuit, 8 lb meat, 2 lb sugar, $\frac{1}{4}$ lb tea, $\frac{1}{2}$ lb peas or oatmeal, $\frac{1}{2}$ lb rice or pearl barley, 1 gill vinegar, $\frac{1}{2}$ gill lime juice, 2 oz salt, $\frac{1}{2}$ oz mustard, and $\frac{1}{2}$ oz pepper.

As well, each man was permitted $\frac{1}{2}$ lb of soap and $\frac{1}{4}$ lb tobacco per week, and two pipes and two boxes of matches per month.

A present-day Adelaide dietitian, commenting on the nutritional value of the rations, says that protein requirements were met in excess of needs, and iron, the B-complex vitamin and ascorbic acid met favourably with scientific recommendations.

The caloric supply the dietitian says, is 3,800, which is fairly high but may have been necessary for the workers' energy output.

The chief weakness of the diet is absence of dairy products - milk (dried), butter or fish liver oil - and consequent deficiency of vitamin A.

Todd not only thought out carefully the amount of food required. He also made sure that it was good quality and carefully packed - except when it went on the hoof to be slaughtered as needed.

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WELCOME TO THE BOSS

Charles Todd, architect of the OT line, was not only a brilliant organiser and a man of stature in the scientific world of the day. He was also very much a human being, who won the respect and affection of people who worked with him.

As he came down the line on his long tour of inspection from the north, he received a warm welcome from the staff at all the repeater stations, where he rested for a day or two.

The staff at Barrow Creek (175 miles north of Alice Springs) made a special effort.

Knowing, as they would from telegraph chatter up and down the line, that the chief was about to visit them, they prepared a rather ornate screed of welcome.

"The undersigned have the greatest pleasure in congratulating you on your safe arrival at Barrow Creek, the central station on the overland telegraph line, and take the opportunity of your presence among us to assure you that we have anxiously looked forward to the present time to express our sincere respect and high esteem for you.

"Your long overland journey from the far north of the colony to this point has been watched by us with intense interest as means offered for us to do so and it is with heartfelt satisfaction we now see you amongst us after having travelled over hundreds of miles of country totally unknown to all white men only a few years ago but through the entire length of which that great agent of civilisation of social and commercial advancement the electric telegraph now stretches its wires literally from sea to sea.

"This has in no small manner been brought about through your indefatigable exertions. It is not, however, our place to say more on this occasion on this head perhaps.

Food obtained in Adelaide was packed by the men of the various work parties for whom it was intended. It was securely soldered down in tins, which were then packed in strong steel cases marked with the letter of the section to which it belonged.

There was, naturally enough, considerable activity in the warehouses where the goods were being prepared.

One visitor is reported to have expressed impatience at all the trouble that was being taken.

"I would strike my pen through one half of these things," he said.
"An axe and a quart-pot is all these men require."

Charles Todd thought otherwise.

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OVERLAND TELEGRAPH – PORT AUGUSTA TO PORT DARWIN

Instructions to Overseers in charge of Works

1. *Overseer responsible for Works, Tools, Stores, Etc.* - Every Overseer in charge of construction parties will be held responsible for the maintenance of strict discipline amongst the officers and men under him and for the proper carrying out of the work entrusted to him: he is to see that the equipment, instruments, tools, implements, and stores are properly protected from injury; and that nothing is damaged, wasted, or lost through neglect or carelessness.
2. *To appoint Storekeeper.* - He is to appoint a trustworthy man as storekeeper in charge of all equipments, instruments, tools, implements, stores, Etc. A list of these has been furnished to each Overseer, to which he is to add all things subsequently received by him.
3. *To keep Equipment, Store, and Stock Books.* - The Storekeeper is to keep three accounts - one of the equipments, etc.; a second of the stores, rations, and consumable articles; and a third of the live stock.
4. *Receipt obtained for all Articles Given out.* - All stores received or given out are to be properly entered in the store or stock-book, and a receipt, in a column kept for that purpose, obtained from the party to whom they are given out. The Storekeeper is to give nothing out without an order from the Overseer.

5. *Serving out Rations.* - The Storekeeper is to be guided by the scale annexed in serving out the rations, diminishing the allowance of any article if he finds that the quantity, as per scale, is not consumed, so as to prevent waste.

Scale of Rations

Flour	per week	9 lbs
Biscuit	"	1 "
Meat	"	8 "
Sugar	"	2 "
Tea	"	$\frac{1}{4}$ "
Tobacco	"	$\frac{1}{4}$ "
Peas or Oatmeal	"	$\frac{1}{2}$ "
Rice or Pearl Barley	"	$\frac{1}{2}$ "
Vinegar	"	1 gill
Lime Juice	"	$\frac{1}{2}$ "
Salt	"	2 ozs.
Mustard	"	$\frac{1}{2}$ "
Pepper	"	$\frac{1}{2}$ "
Soap	"	$\frac{1}{2}$ lb.
Pipes	per month	2
Matches	"	2 boxes

6. *Overseer responsible for Vehicles and Stock.* - The Overseer will likewise be held responsible for the safety and good condition of the vehicles and stock furnished to him. He must see that all teamsters, or men in charge of stock, do their duty properly, and if he finds any neglect on their part, he is to put other more competent persons into their place.

7. *To make Inspection of Firearms.* - The Overseer is especially directed to look after the firearms supplied, and to see that the persons in charge keep them properly oiled, and in good order. For this purpose he should make a monthly inspection of them. He must also take especial care of the powder, to prevent accidents.

8. *Men to be responsible for Tools, Etc.* - Men to whom any implements, tools, etc, are supplied, are to be held responsible for their condition and safe-keeping.

9. *Power to temporarily Disrate or Suspend.* - The Overseer has power to suspend, or to disrate, temporarily, any of the officers or men in his party, in case of any gross disobedience or incapacity, and to appoint others in their place; in which case he is to send, by first opportunity, a report to the Superintendent, giving the reasons for so doing, and if confirmed by the Superintendent, the officer or man so suspended will be permanently disrated or dealt with as the Superintendent may direct.

10. *Overseer to keep Diary, and make Report.* - The Overseer is to keep a diary of all occurrences, and to make a report, at the beginning of each month to the Superintendent of Telegraphs, giving a detailed account of the movements and conditions of the party and stock under his charge, the amount and nature of the work done, and any other matter which may be necessary to put the Superintendent in full possession of all that has occurred since his last report. In the event of the occurrence of any important matter, the Overseer is to make a special report, and forward it by the first opportunity.

11. *Sub-Overseer to keep Diary, showing Time and Occupation of Men, and Work done.* - The Sub-Overseer is also to keep a diary, showing the daily employment of each man, and the number of poles cut, carted, and erected, with the length of wire put up each week.

12. *Overseer to leave Written Instructions with Sub-Overseer if he leaves his Camp* - In all cases in which the Overseer is obliged to leave his main camp or working party, and delegate his authority to the Sub-Overseer, or some other person to act in his absence, he is to leave written instructions, and forward a copy of same to the Superintendent of Telegraphs in his next monthly report.

13. *Overseer to watch over Health and Morals.* - The Overseer is to watch over the health and morals of his party. He should especially direct that any one suffering from diarrhoea should report himself at once, so that proper means may be taken to stop it, as this complaint, if neglected, is apt to run into dysentery and cholera, as well as being one of the symptoms of camp fever. The Overseer is rigorously to suppress all gambling, to stop all profane language, swearing, and quarrelling, and to endeavor, as far as possible, to promote all rational amusements amongst his party.

14. *To rest on Sundays.* - He is to let his party and teams rest on Sundays except in case of necessity or emergency, and is recommended to read a short service to his officers and men on that day - it being of course understood that attendance is voluntary.

15. *To report Death or Accident.* - In the event of death or any serious accident, the Overseer is to draw up a detailed report of the circumstance, with written statements signed by witnesses of the occurrence, should there be any, and forward the same by the next mail to the Superintendent.

16. *Muster Roll called.* - The muster roll of each party is to be called over morning and evening, and no person must be allowed to leave the travelling party, or the camp, without first obtaining permission from the officer in charge, and the person so leaving must report himself immediately on his return.

17. *Expenses on Road.* - In travelling through the pastoral districts it may be necessary to purchase meat from the settlers, in this case it must be paid for by printed orders on the Superintendent of Telegraphs, and care must be taken to obtain the necessary vouchers, which must be signed by the party from whom the meat is purchased, as well as by some one else as a witness to the signature. No expenses will be allowed on the road, excepting such as have been specially authorized by the Superintendent of Telegraphs.

18. *Driver of each Dray responsible for proper Loading and Harnessing.* - The Overseer is to make the driver of each dray or waggon responsible that the loading is properly balanced before starting, covered by a tarpaulin to keep off the wet (if there is no cover to the waggon), and made secure; that the wheels are properly greased, and the tires not likely to come off; that the harness is in good order; that the horses are not galled either by collar or saddle; and the horses are properly shod, according to the nature of the country through which they are about to travel.

19. *Men in charge to look after Horses backs.* - The Overseer is to see that men in charge of saddle, or pack, or draught horses, brush the dried dirt and sweat from the backs of the horses before putting on the saddles or packs, and that they look carefully to see that the horses have not been galled. If any horse is galled, and cannot be spared, a pad is to be arranged in such a way as to take the pressure off the wounded part. He is also to see that, where practicable, each horse has its own collar, which should be

numbered; in any case, he must be careful to see that the collar fits properly.

20. Rate of Travelling. - No particular directions can be given as to the rate of travelling, as it must depend upon the nature of the country, the state of the weather, and the necessities of the case, but generally, the overseer is to take care that the rate of travel neither overtasks the horses at the time, nor is such as cannot be continued from day to day.

21. Horses or Bullocks not to be ill-treated. - No horse is on any account to be struck on the head or legs, nor punished ~~severely~~ except for positive vice. Teamsters and others must remember that more is to be done by kindness, and by humoring horses than by blows, and that the safety of the party may depend upon keeping the horses in good working order, they must, therefore, be very particular in looking after them, and keeping them in good condition. The same remarks apply to bullocks, and similar precautions are to be observed, and care taken with them as with the horses.

22. Horses and Stock to be watched and Labor divided. - Where water is scarce or where blacks are in the neighborhood, the stock must be watched at night; and the officer in charge is to arrange the watches so as to divide the labor as equally as possible amongst his party; thus, teamsters and stockriders, who have been working by day should as much as possible be spared at night.

23. To tether Horse. - If there is sufficient feed, it is a good plan to tether one or more of the horses at night, in order to follow at once any horses that may chance to get away. The same horses should not be tethered for two consecutive nights.

24. *Watch to be kept at Camps.* - In a country frequented by blacks, every party must keep a watch at night. The same must be done by all large parties when camped. It is a good plan for the cook to keep the morning watch, as he can light the fire, and prepare the breakfast during his watch, and thus expedite that starting of the party.

25. *Parties to travel in cool of day or by moonlight.* - During hot weather it will be desirable for the parties to start at early dawn, and thus get the whole or the greater part of their journey done in the cool of the morning; or if there is a moon, and the party are going through open country, they may travel at night; but if the party is large and they are in forest land, scrub, or amongst sand-hills, it is better only to travel by daylight, so as not to risk the straying of any of the men or horses.

26. *Horses as a rule to be kept near Camp at night.* - It may sometimes happen that there is no feed in the neighborhood of a waterhole, where otherwise it might be desirable to camp. In this case the party after filling their canteens or water bags, and watering the stock, should go on until they come to a suitable place for camping. In the morning the horses and bullocks should be sent back before starting to be watered. As a rule the horses must be kept as near the camp as possible for greater protection.

27. *Explorations for Water to be made before moving Camp.* - In a country where water is scarce, or where the state and situation of the waterholes are unknown, the officer in charge must either send some competent person ahead or go himself, to ascertain the best place for the next camp, before moving the party on; and he is on no account to risk the party suffering from want of water.

28. *Precautions to be taken for saving Water.* - On camping at a small waterhole, the officer in charge should take such precautions as may seem best to save the water from evaporation for the use of his own and other parties following. If the water is shallow, a deep, narrow trench, or a well should be dug, and the water led into it, and bushes put across it. Sometimes a larger quantity of water may be obtained from the next rains for future use, by throwing up a small dam, which may readily be done by a large working party. No precautions must be omitted in a dry country for storing water, no matter whether the party travelling is ever likely to revisit the place again or not.

29. *Places where to look for Water.* - Water is, as a general rule, more likely to be met with in the gullies amongst hills than on the plains, and upon the side where the strata dip into the hills rather than upon the opposite side of the hills; above a bed of conglomerate or solid rock crossing a creek is a likely place to find water, or to get it by sinking. Stuart says that water may often be obtained by digging in the beds of the creeks, and this should therefore be tried. All bright green places should be visited as being likely spots in which drainage water has collected. Mound springs may sometimes be discovered by a fringe of rushes or reeds upon an apparent sand hill. Reeds are almost always a good sign of permanent water. Rushes often only indicate where water may be found during the wet season; they are, however, not a bad indication for shallow sinking. When a creek, as is often the case, runs in a valley between sand hills it often forms long reaches with gums growing about them, and then seems to die out on a plain, but forms again perhaps a mile off. If, as may be the case, no water is found in the gum reaches it should be searched for in the plain, and might possibly be found in some small channel away from the creek itself, under the sand hills. If the main creek dies away on an arid sandy plain

water may very likely be found lower down the valley, either on the surface, if the nature of the soil changes and becomes retentive, or by digging. If, on the contrary, it loses itself upon a grassy plain, the chances of finding water by digging are less; but no effort, however seemingly unlikely to be successful, should be left untried in order to find so important a thing as water.

30. Man Lost to be searched for. - If, on calling the muster roll, any man is missed and there is reason to suppose that he has lost himself he must instantly be searched for, and the search must be conducted in a systematic way. The time elapsed since he was last seen will give a clue to the possible distance to which he may have got, if allowance is made for the fact that a person who loses himself seldom follows a straight course.

31. Direction in which he left Camp to be ascertained. - Good trackers should be directed to make a complete circuit of the camp at such a distance as may be beyond the limit of ordinary stragglers, in order to ascertain the direction in which the missing person has gone; and if his tracks, as often happens, become so confused from his wandering backwards and forwards that they cannot be followed, another circuit should be made farther off in the direction of the tracks, until it is positively ascertained that they do not extend so far; and if so, the person must be sought for within the circuit.

32. Fire and Signals to be made. - Meanwhile a fire (as a signal) should be made in the most conspicuous place near the camp; and at night wood, calculated to make a blaze, and by day to cause smoke, should be kept burning. If the party is provided with means, signal lights should be sent up at regular intervals during the night.

33. *Party Searching to leave Marks pointing in Direction of Camp.* - The party tracking should make their tracks as conspicuous as possible, and here and there draw arrows on the ground pointing in the direction of the camp, so that if the person lost falls in with them he may know the right direction to pursue. Cunningham, the naturalist to one of Sir Thos. Mitchell's expeditions, who lost himself, would have been probably saved had some such precaution been taken.

34. *Directions for Persons lost what to do.* - Most recorded cases of persons being lost in the bush show that they lose their presence of mind, and frequently wander round and round often coming back to the same place, so that their own tracks still further confuse them. The safest plan for a person to pursue, who is lost from a party, is, as soon as he finds that he is uncertain in which direction to go, to stop still, as he may be sure that people will be sent to look for him. If he has a match he should light a fire on the highest place near him and keep it blazing or smoking as above, until found.

35. *Men to be left to continue Search after Party gone on.* - In the event of all immediate efforts to find the straggler proving unavailing, two or more men, with horses, should be left behind to continue the search; nor should the search be abandoned until all hope of the man's recovery is lost.

36. *Notices to be left, with Directions, in conspicuous places.* - If all the men have to leave the camp in carrying on the search, a notice is to be posted in some conspicuous place at the camp, which the straggler may see, should he find the camp in their absence; and similar memoranda with directions how to find the camp, should be left at all likely places during the search.

37. *Notice of loss to be sent to Party following.* - Notice of the loss should be sent back to the next party following on the same route, so that they also may be upon the lookout for the straggler.

38. *Parties detached from Camp to take Compass and Matches.* - The officer in charge must see that all men detached on service from the main camp are provided with a compass and matches.

39. *Treatment of Natives.* - Should any natives be met with, they must be treated kindly but firmly. No native must be allowed to come within 100 yards of the Camp without permission from the officer in charge, and then not more than three at any one time.

40. *Not to visit Native Camp without leave.* - No one is to be allowed to visit the natives' camp without special permission; and, in all cases, previous intimation is to be given to the natives.

41. *No Communication with Native Women.* - The officer in charge is especially cautioned to allow of no communication between any of his party and the native women, or of any conduct likely to create jealousy on the part of the natives. This is not to apply to any woman engaged by him, in the absence of a man, as a guide to point out the situation of water.

42. *Property of Natives not to be touched.* - If a native camp, or burial ground, is met with, the property of the natives, it is to be left untouched. If any natives are seen, they must be warned by cooeing of the approach of a white man, as their first impulse of terror at the unaccustomed sight often leads them to throw their spears at him.

43. *Mode of Attack by Natives.* - When natives attack a party, they generally do it by setting fire to the grass, and approaching under cover of the flames and smoke; it is therefore desirable, when deciding upon a camping place where there are signs of the presence of natives, to bear this in mind, and either choose a place where the grass is scanty, or burn a piece round the intended camp. Under these circumstances, it could be well to choose a good position commanding the surrounding country, and where, for say 100 yards around, there is no shelter for a black to creep unseen towards the camp.

44. *Not to Fire upon Natives except in cases of necessity. Statement of affray to be drawn up.* - It is most strictly forbidden to fire upon the natives except in the last extremity, when it may become necessary for the safety of the party; and in such a case a statement is to be drawn up by the officer in charge, detailing all the circumstances which led to this action, together with all subsequent occurrences, and this statement must be supplemented by the written evidence of such men as were present at the time, duly signed by them. These documents are to be forwarded to the Superintendent of Telegraphs by the first opportunity.

45. *Good Crossing-places to be made.* - As not only for his own use, but for the use of the construction and transport teams following, it is important to make a good crossing-place over difficult creeks - unless a crossing has been made by a preceding party - the Overseer is authorized to employ some of his men in making one whilst his teams are spelling.

46. *Crossing-place how made.* - The easiest way of making a crossing will probably be to cut down the upper portion of the bank and throw the earth at the foot; and, if the bed is boggy, to put brushwood, or in bad cases to make a cordero road over it. In cases where there is a narrow deep channel to cross, and timber at hand, it may be even advisable to throw a

bridge across; but the Overseer must decide according to the nature of the obstruction, bearing in mind that it is better policy, if possible, to make at once a crossing sufficient for all the parties who are to follow, rather than a mere temporary crossing for his own party only, which would probably have to be frequently renewed by those following.

47. *Overseer to determine commencement of Section.* - On arrival at or near the commencement of the section entrusted to him, the Overseer is to determine his position by latitude or by other means; and to fix his temporary camp five to ten miles further on upon the line in the neighborhood of timber. Good feeding ground should be selected for the cattle, and an experienced man put in charge of them.

48. *Latitudes of Sections.* - The latitudes of the different sections are as follows :-

Section A	about	27° 00'	to	25° 30'S		Mr. Knuckey.
"	B		25° 30'	to	24° 00'S	Mr. McMinn.
"	C		24° 00'	to	22° 30'S	Mr. Beekwith.
"	D		22° 30'	to	21° 00'S	Mr. Woods.
"	E		21° 00'	to	19° 30'S	Mr. Harvey.

The overseers in charge of two contiguous sections are to mutually fix their point of junction.

49. *Overseer to define piece of Line, and set Party to Work.* - The overseer is next to define a sufficient portion of the line, to enable the whole of his men, not otherwise employed, to get to work, whilst he is roughly determining the general direction of the telegraph, as far as the northern limit of his section. For this purpose he must, in the first instance,

examine what timber there is suitable for telegraphs poles for the first or southern portion of his section, and organize parties to fell and prepare poles, to cart them to the ground, and erect them on the line, putting a competent man in temporary charge of the working parties.

50. Men not to be kept Idle. - The Overseer must remember that he has a working party of twenty men under his directions, and that it would therefore be a serious matter to keep them idle, even for a few days after their arrival on the ground. He must, therefore, before leaving, make full arrangements for the immediate carrying on of the works, and leave written instructions with the Sub-Overseer for that purpose.

51. Overseer to Explore Section, and fix Northern Boundary. - Having set his party to work, the Overseer, with the Sub-Overseer, and two or three men, with three weeks' supply of rations, is to make a two days' exploration in advance of his working parties, when the Sub-Overseer, after receiving instructions for the further progress of the works, is to return to the camp, to take charge of the party, and the Overseer is then to explore the rest of his section, so as to fix the northern end in conjunction with the next surveyor beyond him.

52. Overseer on return to complete Exploration. - As he returns he will be in a position to complete the exploration of his section, the objects of which are :

Objects of Exploration -

- i. To define roughly the line of telegraph in as direct a course as possible, carefully avoiding low lands liable to inundation, drift sandhills, and selecting favorable places for crossing creeks and watercourses. The route selected is to be roughly marked by blazed trees, mounds, and posts, as often as may be necessary, and approximately laid down on map.

- ii. To examine what timber there is within reach of the line, available for poles, and to form a rough estimate of the amount of gaspiping required, and the number of poles to be spliced.
- iii. To look for the best crossing-places of any creeks or ranges, and to select generally the best road by which to bring up his teams.
- iv. To visit the waters along his route, marking the water-level at such as are not running, to enable him at his next visit to form a better idea of the time that they are likely to last.
- v. To select the best camping places to which to move his party as the work progresses.

53. Overseer to forward Report to Superintendent. - Having thus obtained as much information as he can respecting the nature of the country, the Overseer is to forward to the Superintendent of Telegraphs, by the first opportunity, a full report of his exploration, and a tracing of the line selected by him.

Instructions for Constructing the Line

54. Line to be cleared for Fifteen Feet - Scrub, Etc., to be removed. - The Overseer is to set some of his men to clear the line for about ten miles ahead of his working party, causing all scrub, underwood, and overhanging trees or limbs to be cut down, so as to leave a clear space of fifteen feet on each side of the line. Any tree which may endanger the line must be cut

down, and all the top branches cut off and removed to the outside of this space. The butt, if heavy, may be left, provided that it is not nearer to any pole than fifteen feet.

55. *Pegs to be put in and Survey made.* - The Overseer will next range the line, putting in pegs approximately to mark the position of the poles, and higher pegs at each angle or bend of the line. He is to chain the line, making a survey of the country near, and map it to a scale of one inch to the mile. He is to take the magnetic bearings of each straight line; to ascertain the variation of the compass; and to take latitudes about every ten miles, checking these latitudes by frequent observations as often as opportunity serves.

56. *Description of Poles, ETC.* - The poles may be straight rough gum, pine, or stringy-bark saplings, or other timber not liable to be attacked by white ants, perfectly sound, stripped of the bark, eighteen to twenty feet long, nine to ten inches in diameter at the butt and five or six at the top; or square poles, perfectly sound, of the same length, eight inches square at the base and five inches at the top. The butt of each pole to be charred for five feet up. Where only stunted timber is procurable the poles may be scarfed (scarf two feet long, and made in manner shown by drawing in margin) in ~~two~~ pieces, well bolted together with 3/8-inch iron bolts, and bound with three bands of hoop-iron, or binding-wire, in four or five turns each, securely and tightly fastened, the piece forming the butt to be at least thirteen feet long and extra stout. A six or seven feet length of 1¼-inch gaspiping let twelve or fourteen inches into the top of the butt, and cemented in, may be used in place of the upper piece. Number of poles to the mile, twenty, or four chains apart; but where poles of the dimensions before

specified, but only sixteen or seventeen feet long are used, not fewer than twenty-five to the mile must be planted. Bearing in mind the importance of making the line thoroughly substantial, it will be far better to cart poles from greater distances rather than use inferior timber or too many spliced poles. Great care must be taken when erecting the poles to range them in a straight line. The Overseer's pole pegs are to be taken as only approximately placed. Sound straight trees of the requisite girth, not less than twelve inches through, situated on the direct line, may be used if ringed and topped. Wrought iron brackets for insulator pins are to be driven well into such trees, and fixed so that the insulator may be two inches clear from the tree.

57. Masts to be put in at Wide Creeks; Wire Guards at top of Masts. -

Where wide creeks or rivers are to be crossed, requiring a span exceeding four chains masts are to be erected of proportionately increased dimensions instead of ordinary poles. Wire guards not touching the insulator as shown in margin, are to be fixed at the top of these masts, to catch the wire in the event of the pin giving way, and a lightning guard is to be fixed to each mast. Cleats are to be nailed on at convenient distances apart for climbing the mast.

58. Top of Pole to be bound. - The top of each pole is to be bound with hoop iron, securely and tightly fastened.

59. Insulator Pins. - A hole of the proper of exact size to receive the insulator pin to be bored vertically into the centre of the top of the pole to the depth of five inches, and the insulator pin driven in to the same depth, and firmly fixed so that it cannot be drawn out.

60. *Planting Poles.* - The poles to be accurately ranged in a straight line, and planted vertically to a depth of four feet, the ground being afterwards well rammed. In digging the holes care should be taken to disturb the ground as little as possible, the hole being square, with vertical sides, so as just to admit the pole.

61. *Pins to fit Insulators.* - The insulators and pins, previously fitted, are packed together in cases of fifty each. Care must be taken to fit the insulator very tightly on to the pin. Should the pin be a little small for the socket, a wedge must be driven in the top of the pin, or a piece of leather wrapped round the pin, so as to fit the insulator tightly.

62. *Wire.* - The line wire to be securely tied with No. 15 tie wire, in the manner shown by a pattern supplied, and strained so as to leave a deflection of three feet in every span of four chains. The wire must not be strained tighter than this, *and the Overseer must be especially careful to make a thorough examination of each length as it is run out; all flaws or defects must be cut out and the ends joined.*

63. *Joints.* - Special attention is drawn to the joints, which are to be made in the manner shown by a pattern provided (the Britannia joint), well soldered with solder consisting of two parts tin and one of lead. The joint to be afterwards washed to remove the acid. The Overseer or Sub-Overseer is to particularly inspect each joint to see that it is properly soldered before the wire is raised.

64. *Angle Poles.* - Every angle pole is to be well strutted with an extra pole, sixteen or seventeen feet long, and of the same girth as the angle pole, the foot of the strut to be let two and a half feet into the ground and well rammed; the tread of the strut to be let one inch into the pole, and securely nailed.