Engineering In The Services

With The Signal Corps

Do you have the same ideas about the Sigs, or the Royal Canadian Signals, to give them their correct title, as do most people? Are you one of the many who figure that the Sigs consists only of: (1) a bunch of madmen who roar around on motor bikes as Dispatch Riders; (2) some poor chaps who lay telephone cable in the midst of the front line, from little reels slung over their shoulders; (3) a few fellows with those screwy "Walkie Talkie" radio sets on their backs, or perhaps (4) those bird fanciers who train their poor little pigeons to run the gauntlet of war carrying messages? Well, you're right!—to a certain degree. The Signal Corps does jobs like that and the first three listed above are certainly among the most dangerous, and worthy of the most praise; but the Corps does a lot more too, in locations a little more remote from the line. To give you an idea, let's take a look at a Sigs Centre at Army HQ in the field; perhaps we can get a Sigs Officer to show us around, or better still, a Cpl; they have more pull. As space is limited we'll just look at the Line part of the Communications set-up.

The first item the Cpl. shows us is what he calls a Terminal Equipment Vehicle. It consists of a big six wheel truck with an enormous van mounted on it. We enter the side door of this beehive of industry and find ourselves looking at a maze of equipment. On one side wall and the front wall are sets of shelves, with what looks to us like five or six very complicated radio sets on each shelf. The Cpl. informs us that these various instruments are Carriers, Repeaters and Terminal Equipment for Teleprinters. Their purpose—to allow four people to talk at once on one pair of wires, thus necessitating fewer lines for the linemen to build, to enable long distance telephone communication to be carried out, and, to allow teleprinters to be worked simultaneously over speech circuits. Slightly befuddled, we turn our eyes away from these machines with the little red and green lights blinking, and walk over to the other side of the truck where we see scores of iron frames with hundreds of wires attached to them. This is where all telephone lines coming to the HQ are terminated. At the back, we are shown a table with numerous types of testing apparatus on it, from which all testing is carried out and from where the linemen obtain information as to the location of faults in the lines etc. The Cpl. then takes us out and around to the back compartment of the van. Here we find an exchange with eighty odd lines on it. We're [illegible] the other twenty are long distance lines.

The next stopping place is another similar truck, where we find five operators busily typing away on teleprinters. They tell us that they're sending typewritten messages to Corps and other units of the Army, some number of miles away. One of the operators runs the teleprinter exchange, which works on the same principle as a telephone exchange with the exception that all communications are written instead of spoken. The Cpl. then leads us over to see a Line Crew and their equipment. Within the next few minutes we're shown many different types of cable and wire, and told of their various uses for underground, overhead and assault work. We see a Pole Auger truck which digs the telephone post holes, and an exact duplicate of the Commercial Construction trucks found in Canada, which erect the poles and tighten the overhead wires by means of a winch. Our last calling place at this HQ, is a small tent where we are introduced to the "Fault Control Officer". His job is to see that all lines are kept in order. As soon as a line is reported out, he informs the Test Crew, who check the location and send a Line Crew out to repair it. In front of this Officer's desk are several large maps, giving the complete records and locations of all lines. Thus, we wind up our tour of the Line Communications at this Sig Centre.

We're told that there are many other outfits that have just as much equipment, such as the Corps HQ's, the Line of Communication Troops in the rear, and the Railway Sigs. We're also told that at one time, all the Communications in every large city, within hundreds of miles, were run by Signal personnel. More than slightly amazed at this enormous array of equipment and Technical personnel, we figure that maybe there is some Engineering done in the Signal Corps. Would we like to see some Wireless or perhaps some Cipher? —Not today, thanks, our heads are spinning now! So the Cpl. takes leave of us with the famous quip of the Sig exchange operator connecting a line through for the Brigadier: "Go ahead Brig, it's your nickel!"

Royal Canadian Engineers

UBIQUE — — — EVERYWHERE

The Royal Canadian Engineers or Engineers, as the Corps is most frequently known, have no particular battle flags which are proudly displayed with appropriate ceremony. Instead every Engineer carries the word "UBIQUE" wherever he goes, thereby signifying that the Corps has participated in campaigns or battles wherever Canadians have fought all over the world. All Engineers are known as Sappers, a word which has been associated with the Engineers ever since explosives have been used in warfare. The word comes from a particular type of demolition charge which, called a 'Sap', was laid by men who were called Sappers.

In addition to being support troops, it seems to be the Engineers' work to experiment with new things. For instance when Artillery was first brought into use many years ago it was used by troops who were under the command of the Royal Engineers of the British Army. Similarly, during the First World War, the first flying was done under the direction of Engineers. What is now known as the Royal Canadian Corps of Signals was a part of the Royal Canadian Engineers during the war of 1914-18. As the work expanded it was formed into a separate Corps.

Engineers are known as Support Troops and as such may be called upon to do almost any kind of job under any condition. No matter what is needed, the Engineers have always come through with something which will cover the situation. It may not be fancy but it always works. Some of the better known work which started out as "odd jobs" are Chemical Warfare, Mines and minefields, Water Supply for all troops, Demolitions, Sanitation and many, many more too numerous to mention.

No account of the Royal Canadian Engineers could be complete without mentioning the Engineer Services and Works Companies, whose job it was to superintend the construction and maintenance of all Army installations in Canada. In fact the poor harrassed looking individual who was running around some Army camp with a blowtorch and a sink plunger was doing just as important a job as his pal who was over there carrying around panels of a Bailey Bridge.

Bomber Command

The early morning sun beams through the industrial haze near a Yorkshire manufacturing centre, and shines upon a little bee-hive of a community, inhabited nearly entirely by Canadians. This is a Station of No. 6 (R. C. A. F.) Group.

Because the sun is shining a very phenominal occasion—there is a certain keenness to be noticed throughout the station, as everyone is quite certain that we will be 'On' today; that is that an operation will be called.

Dispersed around the large aerodrome, are two squadrons of Canadian built Lancaster Bombers, each one packed with a myriad of the latest gadgets that the 'Back Room Boys' have been able to dream up, and a few that evidently were conceived during nightmare attacks.

Swarming over the black and camouflaged hulks, and jamming the already equipment packed interiors, are the boys of 'Maintenance Wing', the Engineering branch, doing their D. I.s (Daily Inspections). There are the Riggers, checking the flying controls, the undercarriage, and the kite in general. The Fitters are 'running up' the engines, and turning the countryside into a veritable boiler factory. The W. T. boys are checking their radio sets and the Intercom equipment. The hush-hush Radar lads are sitting with curtains over their heads, peering at the ends of Cathode Ray Tubes. The Armourers are swinging gun turrets to and fro. Then there are the Electricians and Instrument mechanics, who seem to be blessed with the responsibility for nearly everything else in the aircraft, that has not been just mentioned.

The Electrical and Instrument Sections, although separate in themselves, are under the same Electrical Engineering Officer, and a very great part of the flying equipment comes under his department.

The Electrical Section is responsible for the correct operation of all electric power equipment in the aircraft. There are also, extensive lighting circuits, the Electric Bomb Release system, an all Electric Gun Turret, and numerous items of equipment with Electrical connections. The Electrician must be an amiable fellow who will co-operate with members of other trades in caring for their equipment. An example of this necessary co-operation can be illustrated by considering the Camera equipment of the Photographic Section. The camera is operated by an Electric motor, the film is kept at a moderate temperature by Electric heating (to prevent cracking at high altitudes), and the operation is controlled by the Bomb Release Circuit.

The Instrument Mechanic is really the 'Jack of all Trades', and must be a master of many. To his section is given the responsibility for all dial instruments appearing before the Aircrew positions of Pilot, Flight Engineer, and Navigator. These include gyro flight instruments, Indicators of Air Speed, Height, engine R. P. M., various engine Temperatures and Pressures, outside Air Temperature, Time, Fuel Supply, etc. Then there is the Gyro Distant Reading Compass; 'George', the Automatic Pilot; the complete Oxygen breathing system; the Nitrogen system, which maintains an inert atmosphere in the fuel tanks above the petrol level; the Gyro Gun Sight, which doesn't give an enemy fighter a fraction of a chance. The Automatic Bomb Sight also comes in this department, so it is readily realized that the Instrument Mechanic must be a very versatile person.

The clock shows 1100 hours, and the 'phone rings in 'Maintenance Wing Control Room'. "Operations speaking—we're on—maximum effort—take-off 1600 hours. How many aircraft can you supply?" The Engineering Officer scans his huge wall chart on which is kept a running record of the state of each aircraft, and gives his reply in seconds, reading off the designating letters of the kites which will make the trip. Like wild-fire, the 'gen' spreads over the entire station.

The 'flight' boys, the fellows doing those D. I.'s, have just about finished their inspections, and are probably concentrating on rectifying some evasive leak in a vacuum line, or chasing down the cause of a poor Meggar test (Insulation Resistance.)

The armourers are the busy boys from here. They have the bomb load figures, and are proceeding to feed more than 200 tons of high explosives into the bellies of those Lancs. It means a lot of hustling.

The electricians have to co-operate with the armourers, after loading, in checking all the release and fusing circuits, and are responsible for the distributor setting, which regulates the spacing and order of the bombs when they are dropped.

The Oxygen and Nitrogen trucks are circling the 'drome serving one aircraft after another. The fuel bowsers are rolling, topping up the tanks to the specified amount. Everyone shows an interest in the fuel load, as from that, and the bomb load, an estimate can be made of the 'target for tonight'. The target is of course always hush-hush, and is released to the aircrew only at Briefing-time, and aircrew are mighty careful to keep that information to themselves.

Time is fleeting. Most of the ground crew have managed a quick visit to the mess hall, and the Air Crew, after their operational meal are beginning to wend their way toward the Briefing-rooms. An hour later the flight vans begin to roll the crews to their kites, and the tension mounts steadily from here on.

One by one, the huge Lancs push their noses out of their dispersal points, and 'round the perimeter track to form the marshalling lines along the track, one line on each side of the runway in use. This is a beautiful sight to see.

It is now approx. 1500 hours, and an hour before take-off time. At the end of the runway, between the two lines of aircraft, is the Flying Control Caravan with its checkered exterior. From the skylight of this vehicle, all aircraft movement is controlled by Aldis lamp signals. Wire communication exists from the caravan to Central Flying Control. This is no time to broadcast our activities, so complete radio silence is being maintained.

All ground crew trades are represented at the heads of the marshalling lines, and many spare parts are on hand in case of last minute necessity.

A gunner wriggles into his turret without the aid of a shoe horn, and fouls a gun firing solenoid lead, tearing it off. Immediately, an Electrician is called, and a new solenoid is obtained from the chest in the Electrical van, and installed in a few minutes.

The Padres are peddling their bikes from kite to kits, cheering the boys with gum and friendship, and helping kill that last long hour.

Finally, 5 minutes to the hour is the time, and intermittent green from the caravan to the leading kites starts a dozen or more throbbing 'Merlins'. More join in soon after and if you had anything to say, you better have said it, for no one will hear you now.

The big bomb doors swing closed, flaps are adjusted for the take-off and the first Lanc. swings into position on the runway. The pilot, helmet and oxygen mask strapped on, sits tensed in his position, looking for all the world like a character from 'Flash Gordon'. The rest of the crew are to be seen at any transparent opening waving 'so long'. The green light shines steadily in a beam to the pilot. Throttles are advanced, there is a terrific roar as thousands of horse power thrash the air, paw the ground, eager for the take-off. Hundreds of thumbs move skyward, a cheer is attempted, and the giant with king size load moves down the runway with ever increasing speed, and raised tail. Immediately another aircraft takes its place on the runway, and this process is repeated every minute for the better part of an hour.

The last beauty disappears over the horizon, the ground crews breathe a sigh of relief, and hundreds of bicycles roll towards the billets.

THE OLD FROG STORY

Once upon a time in a far-away land many, many years ago it chanced that a very beautiful and charming princess went for a little stroll through the woods near her father's castle. After she had walked for some time she came upon an enchanted pool nestled serenely in a pretty little dell betwen two protecting hills. You can imagine how startled the beautiful maiden was when she heard a deep romantic masculine voice coming from just beside her cute little toes. Looking down hurriedly (she hadn't heard of the ratio) she saw—now what do you suppose?—why she saw a handsome frog with a wee little pointed head sitting on a great big green lily-pad. And the handsome frog said to the beautiful princess, "Oh most lovely princess, don't be afraid of me, but please try to hear me", and as the princess stared speechelssly, he continued: "I am really a tall, dark and handsome prince, who was bewitched by an evil scoress into the frog you see before you. To break the frightful spell, all you have to do is take me home with you and put me on your pillow when you go to sleep tonight."

Now the princess was just as delighted as could be, and hurried home with the happy frog to do just as he had said.

Just imagine how surprised the beautiful princess was when she awoke very early the next morning to find a tall, dark and handsome prince close by her side.

But what a hell of a time she had explaining that frog story to her old man!

VACUMATIC PRESTRESSED CONCRETE

Vacumatic concrete is not a new form of the finished material but a new and radical method of mixing and handling. It is being used with prestressing and here the finished material is much lighter.

For thin wall sections a 1-4 mix with calcium chloride is found suitable and with 6 bags per yard a strength of 8500 lbs. per sq. in. has been realized. The slump of the mix approaches 12 inches and is therefore easily handled in the forms. The forms are of metal with sponge rubber at the edges to make the whole air tight. At intervals along the forms are connections to the vacuum pump, these tend to hold theforms in place, remove the excess water and help remove the forms after setting. Under normal conditions 26 inches of vacuum are used and the forms are left on for only ten minutes, after 30 minutes precast sections may be moved to a storage pile for 24 hours curing before being shipped. Vacuum plates are used to lift the sections aftor the forms are removed.

Wall sections are cast horizontally and roof trusses are also precast. These factors and the very short time the material is in the forms would seem to indicate that vacumatic prestressed concrete might help the present housing situation. It has been used in the Southern States in the erection of one storey homes.

A 7 inch channel section carried a load of 60 lbs. per sq. ft. with a one-half inch deflection on a span of 32 feet, but there is sometimes a tendency towards springiness in long spans.

Concrete alone is reliable as a structural material only so long as the stress causes compression in the member. If the member must resist both tension and compression, as in a beam, the tensile force must be resisted by some other material such as steel, wood etc.

The idea of prestressing is to produce an initial compressive stress in the concrete so that when the member is loaded the stresses will merely reduce th compression but never produce tension, hence all of the concrete becomes effective.

There are two methods of prestressing, one is by a special anchorage which produces a tension in the special reinforcing wire approaching 125,000 lbs. per sq. in. By this method the reinforcing is stressed to its maxium before the concrete is poured and has a much reduced stress under live load. One of the advantages of this method is that if any of the reinforcing is stressed to breaking it can be easily replaced, which is not the case with conventional reinforcing which has its maximum stress while carrying live load after fabrication. The other method of prestressing is electrical. Here the reinforcing wire is wrapped with thread with ¼ inch pitch and drawn through a box of sulphur or some low melting point alloy. After placing a potential difference of 2 volts per foot is applied giving about 400-450 amperes, this quickly heats and expands the steel melts and the sulphur which on cooling forms a bond between the concrete and steel. The bend in this case is said to be higher than steel to concrete. The heating must be accomplished quickly so that the concrete is not broken. The steel on cooling produces the desired compressive stress in the concrete.

A bridge in France that originaily contained 220 tons of steel reinforcing was recently replaced with prestressed concrete and only 17 tons were used. A preloaded tank was made with a 2" sheet wrapped with wire stressed to 110,000 lbs. per sq. in. and cover with Gunite. Another bridge that spans 150 feet has a web of only 9 inches where as with the conventional method a 24 inch web would be used for a 90 foot span. By using prestressed concrete we can increase the lengths of spans by 72% and it has an appreciable effect on both the vertical and horizontal shearing stresses.

At the point of failure prestressed concrete will carry no more load than that with ordinary reinforcing.

O. L. Logue '46

Bull Sitting

By So Solly

—with all apologies.

. . . . . Plumbers issue . . . . . not complete without Soliy . . . . . run people down . . . . . they love it . . . . . Beaver done . . . . . Doer dead . . . . . Red and Black too long for little news . . . . . Wick not impartial in views . . . . . 75 per cent voting . . . . . Pretty good . . . . . better than class attendance . . . . . all dances mad brawl . . . . . success of dances measured in number of empty bottles after dance . . . . . want too much money . . . . . no thought of pleasure for patrons . . . . . Junior dance exception . . . . . enjoyed dance . . . . . still made money . . . . . Beavers offered no profit dance . . . . . S. R. C. said no . . . . . (ping Beavers) . . . . . must prefer brawls . . . . .

. . . . . Varsity basketball should watch high school teams . . . . . learn . . . . . beat Mt. A.

. . . . . start again for paved streets and paths . . . . . here by September . . . . . need more co-eds . . . . . good ones . . . . . start drive for more . . . . . ratio too high . . . . . never hear of Seniors . . . . . all die or just too old . . . . . six more weeks then murder . . . . . here's to you . . . . . next one on me . . . . . proofers good job last week . . . . . 100% proof did the job . . . . . Campus very romantic . . . . . no lights on road or streets . . . . . call in Cameron again . . . . . Bye for now . . . . . See you next year . . . . . we hope.

OUCH!

"Beg pardon, but aren't you one of the college boys?"

"Naw—I couldn't find my suspenders this morning, my razor blades were used up, and a bus just ran over my hat."

"Drink Canada Dry?" screamed the billboard.

"And how!" drifted back from a northbound flivver.

—PELICAN

* * *

A woman is a person who can hurry through a drug store aisle eighteen inches wide without brushing against the piled up tinware, and then drive home and still knock off the door of a twelve-foot garage.

* * *

First father: My boy is doing wonderfully well at college.

Second father: So is mine I think he's majoring in language, why just the other day he wrote me for ten dollars for Latin, ten dollars for French and a hundred dollars for Scotch.

* * *

"I'm trying to find a place for an attractive little stenographer."

"Oh, do you want me to direct you to an employment agency?"

"No, to a rental agent."

* * *

Sailor: "Going my way, babe?"

Radcliffe Girl: "My dear sir, I'll have you to know that a public street corner is no place to speak to a strange girl who lives at Barnard Hall, phone Eliot 9433."

* * *

Daughter: My boy friend will not marry me mother because he is an atheist and believes there is no heil.

Mother: Make him marry you daughter and we'll soon change his mind.

* * *

(Soft voice on hotel phone), Clerk there's a rat in my room.

Clerk: Well, make him come down and register.

* * *

Sherman: "What exercise do you recommend for reducing?"

Doctor: "Just move your head back and forth when offered a second helping."

* * *

Salesgirl, showing lingerie to an enquirer: "This is the only place you can touch these for anything near the price."

* * *

Girdle: An elastic supplement to stern reality.

Cannibal: A fellow who is apt to pass his best friend.

This is your annual friend, Walkie Talkie to let you in on a bit of campus scandal. We wouldn't even let that old bugger Snoop in this Brunswickan. What's the matter with that old reprobate, why doesn't he get some variety in his column—same old people, week after week—same old rot—a veritable family compact in fact. Doesn't Snoop know that there are 900 students on this campus—lots of variety to pick from —but oh no we must stick to our own little group—the elites you know.

By the way—wonder of all wonders J. B. M. B. at a dance with a shirt, tie and his own woman. Marysville stock I believe.

—All the boys chasing the young stuff last weekend.—Dangerous doings so soon before Co-ed week.

—Seen at the Governor's reception—Jim Ross, Bill Gibson, Ralph MacDowell, Elmer Scott, Hugh Seely, George Robinson, Vern Mullen, Will Baldwin and oh yes the Connecticut gals, looking more charming than ever. Who in H—— started that rumour about punch bowls—I didn't see any around, but somebody must have found them.

The Engineers so seldom make this RESERVED column, we might mention a few while we have a chance.—Oh yes—have you heard—the Nurses' Residence is now becoming the popular place to spend spare evening (till 10.30 P. M.—at least that's what the rule book says). Bill Crowley, Ken Fenwick, Hugh Seely, Will Baldwin, Stan Goat, Andy Flemming, (Alex. Coll.) and several others are among the culprits.

Oh, my my what's this my secret agent just brought in—a letter to Snoop. He stole it from the mailman. Would you like to hear it—O. K.

Dear Snoop—

For the benefit of your readers and my girl friends I wish to state that I did not write that letter that appeared in your column last week. Some jealous, would-be lover is obviously trying to ruin my irreputable reputation. It's my quiet charm that captures the women's hearts, not the publicity I received by your column. Laugh now Snoop because you'll laugh on the other side of that pan of yours comes the acid test—Co-ed Week.

Belligerently,

CEC. GARLAND.

Now that letter just gives you an idea of what that Snoop is always doing—messing up people's lives, that's what.

Well, I must be leaving now but I'll be back next year. In the meantime—get set for Co-ed week and watch your step.

See you at Chez Frosh Saturday nite. I'll be hiding behind the floor show.

Snoopingly yours,

J. C. WALKIE TALKIE

Is Your Boarding House Warm?

Because of the wartime scarcity of fuels and new heating equipment many a home-owner was forced to shiver, shut off some rooms or insulate. Restrictions in the use of building materials caused a general reduction in the size of houses and practically forced the use of insulation in new construction. The effect was an approximate 39% reduction in the capacity of the heating equipment required.

Lower heat losses through insulation enable the "insulation conscious" public to use equipment burning the more convenient, cleaner, and usually more expensive oil and gas fuels without exceeding a cost of heating which he can afford. For the next few years most heating supplied will likely be basically similar to that of pre-war years as new products take time to develop, be perfected and be accepted by the public.

Two thousand years ago in Bath, England, the Romans circulated hot gasses from charcoal fires through ducts in the walls and floors, today continuous-weld steel pipe or air, ducts are placed in the walls, floors or ceilings and hot-water or warm air is circulated through them. This is known as radiant heating. The theory of radiant heating is that the heated area acts as a large radiator, thus eliminating all visible heating units. It is claimed that with radiant heating the temperature does not vary more than a few degrees from floor to ceiling and that control is very simple.

Radiant heating is especially adaptable to installation in basement or other floors placed directly on the ground. There are many successful installations of this type and they consist usually of a concrete masonry slab in which pipes are embedded. Hot water is circulated through these pipes and the entire slab is warmed. Several installations use hollow tile under the concrete slab and warm air is circulated through the hollow spaces of the tile.

A more promising area for use as a heated surface in radiant heating is the ceiling, generally light in weight, its heat capacity is low and its response to change in the temperature of the heating medium used is greater. Either hot air ducts or hot water pipes may be suspended from the joists in this type of installation.

A recent development is the baseboard radiator, hollow cast iron or copper baseboards are installed in place of the wood baseboards along the outer walls of the rooms. Experiments have shown a floor-to-ceiling gradient of only about 2 degrees F. and floor temperatures were found to be higher, this may be a solution to the cold floor problem. The plaster and plaster base should be in contact with the baseboard to conduct heat into the plaster itself thus utilizing the lower portion of the wall as a radiating area. Of course the wall must be heavily insulated in this type of installation.

There are instances when spot heating is desirable, in rooms such as the bathroom or a problem room in an old house. To cater to this trade several manufacturers of truck, tank and airplane heaters are planning modifications of these devices for use in homes. The general plan is to build small size units and to install two or more.

Experience has proved fairly conclusively that the ordinary fireplace is a luxury. The large amount of excess air used for combustion in fireplaces increases the infiltration to a point where the cost of heating the air often exceeded the value of the heat output of the fireplace.

The gravity warm air system, well installed, provides a uniform and continuous heat output free from noise and with no electrical operating expense, highly desirable for any class of home. Service expense is practically zero with this old standby and the only objection is inconvenience and somewhat greater space requirements and loss of basement headroom. New developments in gravity warm air heating provide for a modulated fire with gas and oil fuels providing an approach to and even the equal of the continuous output of the hand fired installation without its inconveniences.

These aforementioned, together with many other recent developments in modern heating methods, provide a bright outlook for the future of the householder, many of whom now find the heating of their homes a very difficult and often unsuccessful task.

Getting out a newspaper is fun, but it's no picnic.

If we print jokes, people say we are silly.

If we don't they say we are too serious.

If we clip things from other newspapers they say we are too lazy to write them ourselves.

If we don't print contributions, we don't appreciate true genius.

If we do print them, the paper is filled with junk.

Now, like as not, some one will say we swiped this from some other newspaper. Well—we did.

"What makes people walk in their sleep?"

"Twin beds."

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