HANDBOOK

ON

AERIAL RECONNAISSANCE

FOR

1954

Forest Surveys Victoria
PREFACE

Bear in mind that aerial coding is essentially no different from ground coding. This system is designed to take advantage of every break obtaining from air travel, while admitting its limitations. A mechanical approach as far as possible is desirable, in an endeavour to extend its effective utility to many more personnel. Much information aerially derived depends in any event upon judgement, forestry background - and knowing what to look for.

And please, as a member of air coding units - if you are not "at home" with aircraft in any circumstance of attitude or weather, let your controller know.
THAT IS IMPORTANT.

This booklet is particular to one specialized phase. The Forest Surveys Field manuals are your reference for relevant details on typing, coding, operations, etc.
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PROJECT OBJECTIVE

To air code and/or ground code twenty million acres or more with twelve typers who are experienced coders and three controllers who are experienced party chiefs, to type the areas by the end of the field season to inventory standards.

ESSENTIALS

Readily available A/C and experienced personnel for the job. Further to this, the amount of work done depends upon mobile and self-sustaining crew and controller units, lucid instructions with effective follow-up, and good communications.

ORGANIZATION

Ass't. Controller

5MM ac

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<thead>
<tr>
<th>typer</th>
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<tbody>
<tr>
<td>(observer)</td>
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5MM

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Central Controller

Ass't. Controller

5MM

| t | t(0) | t |

- 1 -
Controller level

Central

1. Training observers.
2. Checking observers during season.
3. Dispatching and effective placement of A/C.
4. Personnel shifting to effect uniformity of inflow.
5. Decide next areas to be done and personnel involved.

The last three duties above depend much upon information he receives from the other controllers. Decisions where possible should be made in joint consultation. Where not possible, each controller should have knowledge of that decision immediately, whether it affects his sphere or not.

Orders from Victoria go to this controller only for interpretation and subsequent action.

Assistant

1. Organizing and directing pre-typing.
2. Ground coding direction.
3. Checking (a) typed photos (b) ground coding of two observer units - six typers - before it is sent to Victoria for plotting.

4. Interpretation of his observers' requests and needs, and subsequent action.

5. Tally planning, if sampling is to be done currently on areas under his typers. He is not to be shackled with tally activity on typing completed earlier in the season in an area now far away.

6. Break in crew chiefs on handling of cash expenses, labour distribution, bills (including sheafs of emergency purchase orders), flying reports and photo delivery slips.

The assistants, in being familiar with overall objective and desired results of this project, are fully expected to make decisions on their own whether such decisions are to affect the tenor of the whole project or part. Here again, however, each controller should have
knowledge of that decision immediately.

Typer level

Observers

1. Aerial coding - with ground checks wherever possible.
2. Typing.
3. Help the other typers with him in photo interpretation.
4. Written information to the assistant controller essential to a comprehensive compartment description; also details re. access and priority of possible sampling areas.
5. Keep up month end reports, particular to his unit. One day a month sufficient for this.

Note: Re 4 and 5 above - These duties may be assigned to a typer other than the one doing the observing; they rightly fall to the typer designated as senior man of the unit.

Typers

1. Pre-type
2. Ground code in accessible areas.
3. Type photos.
4. To scan by air, inaccessible areas they will be typing.

Training the observer

1. Elementary aerial navigation and pin pointing position on photos.
2. Species recognition and subsequent determination of species content in area (within type) to be labelled.
3. Height determination.
5. NC vs. Volume vs. Immature. Age determination of immature or NSR.
6. Typewise impression as elicited from ground; checks on aerial call vs. ground checks wherever possible.
7. Recording routine in air, through to office and final typing.

Exactly how Do I Prepare for a Flight?

First you are concerned with the inaccessible areas where air work is involved. Break them up into individual proposed flights area-wise at first. The amount of work in each will become clear to you, however, as you inspect the photos, you will rearrange the areas somewhat at this stage to even things up.
Now you will start making up your detailed flight plans. You should have at least a few of these ahead, thought out and ready to go. Which of the typers do it makes no difference, but the one observing should familiarize himself with the plan of any flight he is about to undertake. Furthermore, it should be discussed with the pilot in detail.

Here is what a typical flight plan will look like:

1
Base to Tojo Lake NLOW

2
Air code around lake on 317:42,44
(four and two)

Ground check

3
Tojo River basin to confluence with Meadow creek
317:46 (three)
317:48 (five)
317:50 (four)
etc.

4
Up Meadow Creek to 316:63 (five)
coming back
316:65 (six) wing photo
316:2 (two)
316:67 (five)
etc.
317:92 (eight) at confluence.
5
Down Tojo to confluence with Yahk River
317:94 (six)
etc.

6
Confluence to base S45W

Important points are brought out in
the following discussion.

You will notice that the flight is set
out in PHASES, six of them in this
example. Now turn to S & R Provisions
to see how they fit in (page 40).

You will notice that each photo
involved has a number in brackets
referring to it. That is the number of
spots you wish to have a good look at
when you get to that photo. It may
develop after you get there that a couple
of types become evident to you that you
couldn't see on the photo alone. SO YOU
DRAW A TYPE LINE RIGHT AT THE TIME OF
SEEING IT AND APPLY A LABEL, if you
think it is worthwhile. On the other
hand, you may have less significant
types than you at first thought. Mean-
time, however, there are question marks
(?) on the face of the photo but NOT
PRE-TYPE LINES. A photo too assiduously
pre-typed just tends to confuse. Pre-
typing of the
basic classes (alpine, swamp, cultivated, etc.) is fine; it means bullwork done and will not confuse. Place your photos in the kit provided in the order in which you intend to use them with the 'key' photo in the centre, compartment and the wing photos in the side drawers. Another effective arrangement is to lay two or three flight lines out as if proceeding to make a mosaic. Now pick out photos by groups that will fold conveniently back to front, front to back, and tape them together to effect an accordion-like fold. One group may be a whole or part of a 'phase'.

MARK NORTH ON EACH PHOTO INVOLVED.
Tape the flight plan on the inside of the glass top for easy reference. Save this flight plan and you will have a diary of your flight proceedings. You could add the hours flown, and passengers at the bottom and your flying reports will be a cinch.

Some topography will have sharp relief affording easy pin-pointing on the photos and maps.

Some topography will be flat and rolling for miles. In this case, you may have to go strictly onto flight lines and forget about drainages. The flight line itself will be your flight path.
Outline for me, the actual observing technique.
You start out by making yourself a couple of field work books,
big enough to hold the following headings across the two
facing pages, on one line.

<table>
<thead>
<tr>
<th>R. Comp.</th>
<th>Foto</th>
<th>Land Type</th>
<th>s.t.</th>
<th>No.</th>
<th>No.</th>
<th>Form No.</th>
<th>no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
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<tr>
<td>9 &amp; 3</td>
<td>9,3a</td>
<td>1</td>
<td>20</td>
<td>18</td>
<td>19</td>
<td>21</td>
<td>22</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Species</th>
<th>Age</th>
<th>Height</th>
<th>Canopy Vol.</th>
<th>est.</th>
<th>Cond.</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resident</td>
<td>Assoc (imm)</td>
<td>direct</td>
<td>direct</td>
<td>Canopy Vol.</td>
<td>est.</td>
<td>Cond.</td>
</tr>
<tr>
<td>40 +</td>
<td>+20-</td>
<td>direct</td>
<td>direct</td>
<td>Canopy Vol.</td>
<td>est.</td>
<td>Cond.</td>
</tr>
</tbody>
</table>
On the very front page of your field work books you will draw in large letters the prefix serial of your unit, which will be one of the following: A184, A185, A186, or A187.

The regional, compartment and photo no's. pin down the location of your label.

Landforms are requested for the purpose of getting typers landform-conscious. Photo interpretation will ultimately benefit as the affect of aspect on species distribution and stand characteristics are observed and noted. Landforms are simplified to north and south and to major physiographic units; R (river bottom), L (lowland rolling or bench), Vn (Vally-side north), Vs (Valleyside south), U (upland rolling or bench) and A (Alpine and sub-alpine).

What is lowland and what is upland? Call each drainage on its own merits, that is, pertinent to the question of what is lowland and what is upland, particular to that drainage. After all climate (both ecoclimate and regional), soil water regime, and soil nutrients govern to a great extent the worthiness of a timber stand.
For type No's. start out at 1 for air numbers, and at 1 for ground numbers and don't repeat a number within each series again for the summer.

Sub-type (s.t.) numbers are always -1 (dash one) and apply to the type immediately preceding them in the work book. For their use and meaning, read bottom page 20.

For the rest of the frame and how it is filled out, let's go flying.

Go back to Photo No. 317:94 (six) on the Yahk river. It has six question marks on it to be replaced by labels. Or so the planner thought by inspection.

Now you are over the very ground, have pinpointed yourself as definitely being there, and you are prepared to 'observe'. The nearest one (as it happens) is a burn. It is fairly recent so you will have to ask the pilot, who is flying at the usual observing height of eight hundred to a thousand feet, to let down-quite often to within a couple of hundred feet of the ground and circle for a good look. The first thing to enter your mind is - It's NP, NSR, or immature, or possibly NC. It's not NP because there is growth of some kind, but most
of all, it is surrounded by a good site.

The generally profuse deciduous cover has, or hasn't conifers in it? If it hasn't, and if the deciduous appears thick and firmly established, better call it NC.

If there are conifers, however, in a generally discontinuous deciduous cover, and their frequency is obviously low, the area is NSR. So you boom out to your recorder over the intercomm. "Stand structure - 9, under 18...1, under 19...1, under 20..." etc. up to 23 inclusive. "Age, 12 years"

How did you arrive at that? You spot growth you know must have come in since the fire; the deciduous will undoubtedly have come in as soon as any. It has not taken on form yet, is still in clumps, fifteen feet high. So there is nothing very reliable there. You spot a few of the higher conifers. They are about 8 feet tall. The whorls are not very closely spaced on the stems. That means good average annual growth. So height is a pretty close indicator of the age. But look around at some of the other conifers to substantiate. What if you see a squat conifer five feet tall and evidently closer whorls?
If not many of his pals are that way, then he is a victim of a purely local site factor - competition, poor start on shallow soil, etc. and is not to be used as a standard of the whole site.

If all the conifers want to be squat about it, then that conifer is a good indicator tree. Age comes out to the same thing - only you have a poorer site.

Species on really young conifers is a toughie, other than Pl. But it is a safe bet that the youngsters will be the same as the nearest seed source. Species content is not as important at this stage of stand development anyhow, anymore than to indicate the dominating species association.

So you tell the recorder, "Pl resident, some spruce associate. Record it 20 plus."

Suppose that this same area had a fair frequency of conifers. Now it's getting tougher to decide whether to call it immature or NSR. Our standards say that full stocking for this area would be about 750 trees. We are, however, reclassifying anything over 50% of the above figure (in this particular
age class) which would end up as 375 trees per acre. You aren’t going to look for an acre and count, hardly, from the air. But you are going to recall that 3 7/5 trees/acre give a spacing figure of about 15 by 15. Now you are getting somewhere. If the young growth is uniformly distributed (an ideal situation) you won’t even have to use your imagination. If it is unevenly distributed, either in single trees or in groups, you will have to do some mental redistributing. (I told you these borderline cases were no cinch from the air.) If, out of all that, you judge it is still NSR, say so, stocking 21 to 50%.

If, out of all that, you judge the area is sufficiently stocked, say so: "Stand structure - 1, under 1...1, age - as above, species - as above, height - direct. Remarks: minimum stocked, group occurrence, satisfactory fill-in expected."

And on to the next area; this also is a burn. It is not fooling you any. It is the same burn but with heavy reproduction, making it appear different on the photos. Due to competition, the height is generally lower, but at that height it makes no difference (that is, another height class is not involved.)
P1 has completely taken over, so thick that the stand will be set back considerably in development. NCC is a safe bet in describing that stand as it is going to be so for a good many years. So everything is the same except species content and stand structure — now under 3....1.

The next area is mature, under the 2.. what? You are now at about one thousand feet (or should be) so that you may see if the stand is breaking up or not. No,, it isn't. In fact, it is difficult to tell whether this timber is late immature or thrifty mature, (another dirty borderline case.) Have a look at some of the boles down through an opening. There is volume alright, so you call it 2, though it may be late immature in terms of years. Under the 2...2 at last.

Species. You can tell P1 always (wait until you see it a few times). You can tell spruce, especially this younger stuff by its copious "sprucing up" tendencies in the spring, giving a very bright reflective green — down sun at the apex of the light intensity. You can tell Balsam by tone (a muddy blue) or by its spiking out tendencies at an early age. Fir is a very dark species from the air. More than that, however, it seems to resent an orderly symmetrical crown,
coning gradually to the leader. Anything but. Hemlock looks sickly, from its drooping leader to the pale, nondescript green. Py is a ringer with its plated bark and open growing site. Larch is distinctive by its exceptionally light foliage. Species not mentioned will warrant your attention for helpful notes on aerial identification.

Always, one species dominates the stand. So we call it a resident. And we say that a resident (in order to be one) must be over 40%. If the stand is pure, of course, there is no question about it. One or two other species may have decided they like the country too. So we may find a (say) FH 70/30 about, or turn-about HF. In either case, the first species recorded shows who's boss. Or we may have a FHC (those three in any order) showing that Fir, in this case, dominates yet, and hemlock and cedar vie for what is left after at least 40% for the fir.

These other species such as the H and C above, we call associates. They may be above or below 20% when recorded but understood to be under 40% in any case. The ones under 20% normally are not recorded because they do not constitute reason enough for calling another type. But you should choose to record them when you think they are of some importance and should, therefore, be mentioned.
e.g. vet fir in an otherwise spruce dominated stand, Cedar poles, occasional Pw, etc.

In summation regarding species, here are your possibilities:

<table>
<thead>
<tr>
<th>pure stand &amp; one associate</th>
<th>F</th>
<th>F</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
<td></td>
<td></td>
<td>70/30</td>
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<table>
<thead>
<tr>
<th>Resident &amp; two assoc.</th>
<th>F</th>
<th>H</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>40</td>
<td>30/30</td>
<td></td>
</tr>
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</table>

and can have a number of associates 20% minus with any of foregoing; they are recorded, when important enough to mention, in brackets when the code sheets are made out.

Next thing you judge on this mature stand is its height. Record that direct, nearest ten feet. Never mind those height classes for now; call what you see. There are several approaches to calling height; all of them good - for height is relatively easy to judge from the air. You may get used to one height (say) 80 feet and go up or down from that. You may have been a logger and used to 30 foot logs, and so call in terms of that. You may harbour in the back of your mind the prevalent heights for species for that part of the country.
You may realize that height class 22 of inventory coding covers trees from 66 - 125. But that doesn't excuse a poor attempt to call to 10 feet.

Volume estimates on the ground are reflected in height and stocking class. So far you have only height. "But you are going to approach this stocking class problem in a round-about way.

Crown density, crown diameters, and height do reflect volume quite reliably. So you will indicate crown, or canopy density in tenths, direct. Remember, that is total canopy of coniferous, just the same as calling the amount of sky that is blanked out by cloud, 6/10... 8/10 cloud cover, etc.

The next column concerns volume estimate. In that column we want an indication, by number, of what portion of that canopy is occupied by crop trees. Have a look at the crown vigour and bole sizes. Oh yes, you can see a lot of the boles; and you can get a good idea whether they would be worthy of the logger's attention or not, either as pulp sawlog, tie, props or pole material. What portion of them are crop trees for all or any materials? You estimate
about half. Put it down. 5 for fifty percent.

You have stand condition to fill in; use 1, 2 or 3 of the 5 possibilities.

You now have remarks.

Let's review the line in the field work book that you (may well) have just filled in.

$2(4)^2$ SP1 90 8 2 3 Remarks: Stand beginning to break up: Small stems from locked condition.

2 for main crop volume
(4) for decadent.
SP1 about 70/30
90 for ninety feet high.
8 for eight-tenths canopy cover.
2 for very few crop trees - in this case, about a fifth.
3 for diseased-serious.

There is a lot of information in that one line. If you are desperate for volume types, you might keep it as one, though obviously a dubious one. It is most likely a non-commercial stand. We've been on this photo No. 317:94 (six) for a long time now. Three question marks downed, three to go.

- 19 -
Let's say the last three are spaced along a hillside. The person putting them there could see differences alright. Now you are right over the area. You observe that the whole area is a hodge-podge of P1S\(\text{A}\), all same age and height. But there occurs pure pockets or stretches of P1, sometimes S, and then A, as well as the interspersions of the mixed community. You decide that the blends are too subtle to try and type out on the photos. You could right now, but it would take a half hour of flying over the area to do so. Moreover, no pure type (of the three present) occupies dominately the hillside. So you are going to put one label on the whole thing; P1 definitely a resident. Aspen is fairly well distributed, Spruce heavy in the draws and fingers out into the rest of the area sparingly. Therefore, you call it P1A(S) and follow on with age, height, etc.

Now there may be a difference in that area, for instance, spot burns of more recent origin sporting pure P1 much younger and shorter than the rest of the stand. They are quite distinct from the air but less so, or not at all on the photos. You feel they are extensive enough within the big type to warrant establishment as another main type. So you describe one of these spots
in exactly the same manner that you did for the main label, only you use a -l (dash one) in your field work book and on the photo to show that the type being described is a sub-type to the main one.

Later on in the office you will treat these s.t. numbers in one of two ways.

1. Eliminate them and incorporate them into the main type, because you couldn't see them assuringly enough on the photo under a stereoscope, or
2. Type them out if you can see them, and give them a type number of their own.

Basic class numbers, history symbols, and map notes should be used in the air the same as on the ground. Start using type numbers at the non-commercial level where the areas involved are anything over a couple of hundred acres. 3-A, 3-Br, 4-Pl, etc. are quite permissable on small isolated areas of non-commercial.

You may use the LSVX map note in the air direct. This designates low sites now having a low volume of cordwood calibre on them, and which, once this volume has been removed, will not produce another crop in the reasonable future.

In short, they have no soil expectation
value, in view of their low site characteristics.

What is the real purpose of this map note? Its real purpose is to disabuse ourselves of the incorrect application of the N.C. notation. An N.C. area indicates an expectation value, and that the site in question is temporarily handicapped by non-commercial cover, but will recover once the deterring factor is removed, to yield a commercial crop in the reasonable future.

Two examples of low site cordwood volume are: (1) a sixty to seventy foot balsam stand with the odd better tree, either spruce or balsam, in a constant state of breaking up and self replacement through the centuries. (2) Miles of lowland with no definite drainage pattern, interspersed with swamp, but the whole area quasi-swamp site with only narrow ribbons or pockets of better trees on higher ground.
What are my chances of being correct in aerial coding?

Let's go from the easy to the difficult forest cover occurrences to describe, for and answer to this one.

You should score quite consistently on height, pure species, age of immature up to more or less seventy years, and on obvious areas of non-productive, non-commercial, and not sufficiently stocked forest.

You should be able to indicate with some confidence species combinations condition of timber, and general volume estimates by height, canopy, and proportion of it occupied by crop trees.

Border cases between NSS, immature, and thrifty mature will always give the most experienced observer trouble. So will complex species associations.

What do you expect of me once I'm considered ready for production?

Remember, you are never fully trained; the whole summer wouldn't be enough, though we hope to gain on this point by confining you to one area. Patterns of species associations, burns, site, landforms, etc. should become quite familiar to you in awhile, within that area.
You have to be able to map read, and you must be at home with aircraft in any circumstance of attitude or weather. If you are not, you will not be able to concentrate on observing. So you are transferred or grounded. And believe this, there is nothing personal in it.

A three to four hour flight exacts constant effort from you to make it worthwhile from beginning to end. Two such flights in one day puts you under definite strain, which shows in your work. Therefore, if the distance out to the area is considerable, plan on overnighting at a lake and do work on the way back next day. If the distance from home base is short on the other hand, then plan two shorter flights for the day's work.

Your development as an observer carries through several stages. If you have not flown much before, you have the problem of getting used to air travel in matters of distance - time - map or photo scale relationship. Preoccupation with this relationship is worthwhile in furthering your appreciation of what to expect.

Typical questions to settle: How many minutes to cross a photo of - scale in A/C A at 150 MPH, and in A/C B at 75 MPH? On various scale maps (you are likely to use) in a time lapse of - minutes, how many miles
(inches) along a line of flight does one move? etc. A good pilot-observer relationship is important. The observer's role in this partnership is to let the pilot know any and all details of (a) this work at the outset and (b) each trip about to be taken. Further to this, learn a few things about the A/C - rate of climb, cruising speed, observing speed, take-off distance, stalling tendencies in steep turns, endurance with full tanks, etc.

Then your development as an efficient observer, the stage at which a label of yours ameliorates air-discernible stand differences without losing one, or giving too much preference to another. If these differences transgress the limits of inventory standards in the first instance, but defy reconsideration for inclusion into the one label after their economics, their futurity, their relative importance have been mulled over in your trained mind, then more than one label is required.

As examples, what would you do where:
1. 60 yr. old Pl now, much shorter S is easily discernible down through it.
2. Canopy 9, 2 of it Vet fir, 5 of it thick pockets of Pl, 2 of it young Fir.
3. Upland B dominated stand Canopy 10, 1 of it in volume.
What if I change plans after leaving base?

If you have to change plans after leaving base, it makes little difference—so long as you can effectively pin point yourself and report your intentions from each position given. In short, take as much guess out of it as possible for the search boys, should they have to go looking for you.

How can I record information on areas for which I have no photos at the time?

This very case often came up last year. The following simple routine worked out alright. On the small scale map you have of the area (it was photo key maps with us) apply a sticker nearest the spot you are describing and label it the very same as you would have done to the photo. When you get back on the ground, you should hunt up the photo involved and transfer the label to it. Upon doing this, lift the sticker off the map.
If you have no map available the next best thing is to use the pilot's map for gazetted map names. In cases of this sort, the best you can do is a running account in your diary of what you see, using such names obtained to pin down the general location. When you get home, hunt up the photos concerned - it will surprise you how much information you can remember in some detail, particular to any area. You may have to go onto reco standards in labelling the photos; that is better than nothing at all.

No trip by air should be made without some information for 'the common cause' coming out of it. Every single person including the controller on the project should be 'looking' and recording what he sees in some ordered fashion; but most of all, to follow through to the photos.

Outline for me the recording routine in the office.

You have just come down from the air. Your field work book is choke full of information to be filtered through the central type registers. These registers are very much the same as the field work books. But you omit the s.t. No. column; you write stocking in place of
canopy and volume; and you insert in the age column not age in years for mature, but physiological age by two symbols; it is either (M)ature or (O)vermature. There will be two registers that are identical except one has Al8½ on the very front page; the other has 18½ on the very front page. The first one mentioned is for filtering of aerially derived types; the second one for ground derived types. Each will have thirteen sections, each section consisting of two or three pairs of facing pages and easily opened by edge tabs. The tabs from the beginning will bear the following notations:

1 F = F, FP1
2 F plus pulp = FH, FHb, FHbS
3 FS = FSP1, FSPy, FSL
4 FPy = FPyP1, FPyl
5 FL = FLP1, FLpW, FLpy, FL plus pulp
6 FC = FCH, FCB, FCS, FCHb
7 C = CH, CS, CB, CCy, CHb, CHS
8 H = HB, HbS, HS, HPw
9 S = SB, SP1, SBP1, SL
10 Pl = Pl plus deciduous
11 Deciduous
12 Non commercial
13 Not sufficiently restocked

So now you will enter each type from the work books into the register in the
stall it belongs. As the season progresses, you will be bringing in information that has already been described and entered. That merely means to substitute the original number of that type for the one you used in the field work book. You don't erase the last number; you merely write over top of it both on the photo concerned, and in the field work book. In that way, you don't ever lose the meaning of a number, or what you did with it. Moreover, we may sometime in the future, want to call the stands a lot closer than the inventory standards now prevailing; and we can do just that if we don't erase anything in our current office routine, and if we keep the field work books at Victoria for future reference.

Every once in awhile take an armful of code sheets and fill them out for the established types in the registers.

Height classes of inventory means we will be throwing seventy foot stands with one hundred and twenty foot stands, for which one code sheet suffices. But that is not our worry on this project; it gives us the marked advantage of broader typing than on thirty foot classes. You will appreciate that as a typer when you realize that you will by typing about
five hundred thousand acres a month per typer.

You will put the full handle on the photo front, that is, the number 14 type aerially derived will finally appear as A184A14, or 184A14, if it happens to be ground derived. And the code sheet applying thereto will be sent to Victoria along with the photos of the map concerned.

Remember to use the inventory standards as shown in the typing manual, and apply the code classifications to your field work as you lift it from your work books for entry into the registers.

Diaries have a very real purpose. If properly kept (requiring a few minutes each day) the monthly reports will be a one day interruption of each month instead of days. A poorly kept diary will deserve, and get, action from your controller.

Record in it:
Cash disbursements — for your own satisfaction.
Your flight plans with flying time, from-to, hours, company, and passengers, for that month end flying report.
Breakdown of activities — field, office, days off, etc.
Film notation if camera shots are being taken which require accurate captioning. Easy procedure here is to take one snap in the roll of anything readily recognizable, then tie the rest of the film into it.

As an observer, what checks are going to be made on my work and by whom?

Your assistant controller will satisfy himself as to your map reading (tracking) ability. Some considerable time may have to be spent on this because it is important that you know where you are at all times. It is not easy; some people just don't catch on. If you are one of those then you don't fly.

Your assistant controller will check your typing - lines and labelling that is, in the office.

Your central controller will check on the validity of your labels as derived in the field, aerially.

Your assistant controller will check on the validity of your labels as derived on the ground.

All the foregoing are checks made in the interests of changing wrong notions you
may have before they affect too much volume of work. Argus-eyed, hawk-nosed probers are scarce in these parts. But you have a controller, or 'super'. He arrives to stay for awhile, bent upon helping you.

What is the final form of my work?

Think back to your field work book numbers. You realize that they express precisely, without regard to groupings or classes in age, height or stocking, your observed opinion of a stand. Now, we don't wish to lose that opinion, although we shall have to group for the sake of easier typing. Therefore, put that original field number in smaller print squarely on the area to which it applies on the photo face, and bracket it. On the final map, here is what your field work might look like:
PLOTTERS, TAKE NOTE: Place the bracketed numbers exactly where shown on the photos. The main label (in this case A184A17) can go anywhere in type boundary.

The type lines are 'lifted' off your photos onto auto-positives of the appropriate photo laydowns by means of Kail Plotters. At this point you can see the importance of sending in photos on which all of the typing is tied together properly. The plotting staff is there to plot, not to do your typing for you. A missing label or a hanging type line will bring the curse of all upon you.

A standard legend will then be affixed to the bottom of the plotted auto-positive. On its left will be the essential symbols and basic class numbers; on the right will be the appropriate index map. Most important will be the type description panel in the centre. It will decode and describe all the type numbers shown on the map as follows:

<table>
<thead>
<tr>
<th>Type No.</th>
<th>Stand Structure</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>A184A17</td>
<td>M or</td>
<td>SPI</td>
</tr>
<tr>
<td>Exp.ained</td>
<td>M (dec)</td>
<td></td>
</tr>
<tr>
<td>Aerially dervived</td>
<td>It is mature or mature dec-</td>
<td>S is dom. or species P</td>
</tr>
<tr>
<td>by coder</td>
<td>adent; only</td>
<td></td>
</tr>
<tr>
<td>No. 184</td>
<td>his</td>
<td>Pl associate</td>
</tr>
<tr>
<td>No. 17 asif</td>
<td>those two</td>
<td>about 70/30</td>
</tr>
<tr>
<td></td>
<td>choices</td>
<td></td>
</tr>
</tbody>
</table>

- 33 -
<table>
<thead>
<tr>
<th>Age</th>
<th>Height</th>
<th>Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imm</td>
<td>66-125</td>
<td>11-30 (S &amp; M)</td>
</tr>
</tbody>
</table>

self - exp. eleven to thirty crop trees yielding suitable saw-log and minor products.

If anyone using this map is not happy over such a generalized description, he can write us and ask for details regarding your 241, 242 and 243; they will be in the field work book. He can average the results of these three observations and come out with a closer answer, likely of the order of 90 feet, and 25 crop trees.

What part have I in the overall control of the project work?

Three recording mediums of the summer's transactions and work will be used. The first and probably most important one is the project Photo list.

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## Project A54

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td></td>
<td>U</td>
<td>U</td>
</tr>
<tr>
<td>E.G.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/97</td>
<td>BC292</td>
<td>1/40</td>
<td></td>
</tr>
<tr>
<td>to Vic.</td>
<td>1/21</td>
<td>22-40</td>
<td></td>
</tr>
<tr>
<td>to other U</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>From other U</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Several copies of this photo list will be made up, each controller and each observing unit will have one or more.

Before the start of the field season, only the flight no.'s in order, the foto totals, and broken down by map sheets will be inserted.

In the organization period the unit No.'s to which the photos will go are added.
During the field season the "to Vic" line will be filled in as done, as well as to, or from, other units.

What is the real purpose of the above?

There are several advantages. But the real purpose is to tell you (as a typer unit) how much work you have left to do at any time IN NUMBER OF PHOTOS. You were issued four thousand, you have two thousand left (July 1). The central controller will tell at a glance too, whether you can finish or not, whether you need help, etc.
The "R" talk forms

These radio talk forms are headed up for the prime intent of directing the sender into a more complete message, and to form for him a suitable diary of requisitions, instructions, etc.

R talk
Sent to ___ or rec'd of ___ Date ___

1 Current req'ts (gas, a/c, equipment)

2 Mapping info. (answer req'd on, or rec'd on, as ffs.)

3 Progress
____________________ fotos of total___

Fotos req'd.__________________________

Progress map report____________________

4 Misc. (problems, travel plans, news)
The third control measure is a progress map of your area with three stages marked on it, as they develop:

Area flown - your own system of hatching
Area typed - as above
Sent to Vic. " "

Controllers, upon visiting their units, will bring their photo lists as well as their progress maps up to date. Any of this information can be passed over radio, however, at any time. It should, therefore, be kept up to the minute by the typing units.
Greater economy on our A/C

Desirable points in hiring an a/c for this job are:
1. Speed of a/c - one with fast cruise for getting to and from job but low speed maneuvering while on the job.
2. Good observation.
3. Good endurance.

The present fallacies related to forest service routine in using aircraft should be avoided. These include:

1. Dependence on commercial fueling points. We shall endeavour to have our own gas caches where we want them and charge same against the company, contract or otherwise.
2. Using slow expensive freighters with poor observation for observation work.
3. Allowing doubled up hours on a job. If men go into a lake for a day or two, the a/c goes in with them and stays there, to be used as deemed fit to supplement the ground work in that area. This involves one trip in, one out, instead of two in and two out.
Safety and Rescue Provisions

1. A duplicate copy of the flight plan will be left at the unit base concerned.

2. The aircraft will report its position upon starting each new phase, at least. The ground radios involved will be any that are best able to receive the messages. The ideal would be the radio of the coding unit concerned. The messages are to be copied with care, TIME, POSITION, STARTING-ON - or TRACKING, and DESTINATION, if expressed.

BVK to Kamloops position 292:97
starting phase 3

BVK to Kamloops position 292:101
on phase 3

BVK to Kamloops position 292:121
tracking to  (293:36 or
BVK to Kamloops  (home base or
position  (Gander Lake
Blue Lake tracking(or course

3. A rations parcel and a complete First Aid Kit will be at standby with chute(s) attached at F.S.H.Q.

4. A downed plane having duff radio
will use the following ground signals:

N Emergency personnel (one stretcher case)

\( \overline{N} \) " " two "

\( \overline{N} \) " " three "

etc.

T All personnel mobile; await your instructions for rescue.

5. The spotting aircraft will immediately know in this way what is involved. It will, therefore, write out instructions on the spot and drop them with the rations or lst. aid parcel. The instructions will include how many men will be sent in as stretcher parties, if needed; or the ground course to the nearest accessible map point if everyone is mobile.

ON NO ACCOUNT WILL PERSONNEL LEAVE THE SCENE OF THEIR DISABLED AIRCRAFT until outside rescue efforts have proven futile.

6. Each F.S. unit flying is to make up a light kit, regardless of the emergency supplies normally carried in commercial planes.
It is to include:
Rolled oats
Sealed back bacon, pemmican or jerky
Dot chocolate
Liptons Soup
Toilet roll (ideal signal material)
waxed matches
snaring wire
candle

Each man to have his CAULKS and knife on each flight.

No side arms, by F.S. ruling.