

MORE ABOUT SURVEY TECHNICIANS

F. H. Marsh

The formation of an Association for Survey Technicians in Ontario has long been a must. A few technicians have taken on the job which is by no means small, of forming just such an organization. The first question generally asked by Land Surveyors and others, is "What are your objectives?". This can be answered briefly by saying that our objectives are to assist in the promotion of the science of land surveying and the education of the Members of this proposed Association in connection with the practice of the Profession of Land Surveying. Breaking this down we have - 1) the establishment of standards; 2) general education 3) additional education; 4) technical qualifications for both office and field staff; and last, but by no means at least, the recognition by the general public and the surveyor that the work of the Sur-

vey Technician is a trade.

The existence of and the need for trained survey assistants cannot be denied. Every Survey firm employs one or more of them. Some Survey Branches of the Government Departments and similar public bodies, employ many more Survey Technicians than they do Surveyors. As Land Surveying generally becomes more complex and technical, the need for trained assistants and the number employed, increases. It is this need, among other things, which the Association of Survey Technicians is aiming to fulfill.

Please refer any enquiries regarding the proposed organization to the executive committee by addressing Mr. F. H. Marsh, Chairman, Organization Committee, Association of Survey Technicians 1015 Warden Ave.,

TIME GENTLEMEN

W. Harvey Hall, P. Eng., D. L. S., O. L. S.

A problem often facing the surveyor has been the obtaining of an accurate azimuth on the ordinary isolated parcel or small subdivision, particularly in more remote areas.

This past winter, I found myself on just such a small survey in the near north. I had to have azimuth but my watch was not quite accurate enough to do a solar azimuth by hour angle and with ordinary equipment I distrust solar azimuths by altitude, so I waited for polaris and the wind to die down, which it refused to do. The tripod was rather shaky and to overcome this we had to pile snow around it as high as possible. One of our flashlights failed, so we had to build a fire behind the picket. At twenty degrees below zero I tended to get my big wet nose stuck to the barrel of the telescope. I got a charlie horse in my neck from trying to observe from an awkward position on the snow pile.

I finally got my observation completed and then had to hike three miles through more than three feet of soft snow, on snow shoes, to the road and then to camp by jeep.

Thoroughly chilled, numb both physically and mentally, I forgot to check the contents in the whiskey jug, it must have been fairly deep in there because the next morning I woke up in revolt. No human should have to suffer so and an answer had to be found.

The surveyor, like a ship in these circumstances, must be able to carry accurate time over long periods. With a little investigation I found that this year, a small eight-transistor standard wave - short wave radio has come on the market; dimensions 3" x 5" x 8" and three pounds all up weight cost price under sixty dollars, exactly right for a parka pocket. The power plant consists of three fountain pen batteries. Carry

extras, they cost little. A cheap watch of any kind with a second hand serves to carry time between signals. A bit of exposed photographic film serves as a light filter if the transit is not fitted with one.

The answer was of course so simple that many readers need not continue but I will give our drill and some of you will be able to improve on it, so let us have any criticism. Our standard booking of an azimuth is as follows:

Latitude  $45^{\circ}53'8''$  N.

Longitude  $82^{\circ}06'8''$  W.

Date 13 Feb. 1959

Cron. 24.300 slow

	Time Observed			Correct time			mean of times			Angles		Mean Angles	
	H	M	S	H	M	S	H	M	S	O	I	O	I
C/L R.O.										00	00		
C/L $\odot$	17	35	36	17	36	00				39	29		
C/R $\odot$	17	37	36	17	38	00	17	37	00	220	27	39	57
C/R $\odot$	17	38	53	17	39	17				220	39		
C/L $\odot$	17	41	08	17	41	32	17	40	24	40	31	40	34
C/L $\odot$	17	41	54	17	42	18				40	39		
C/R $\odot$	17	43	08	17	43	32	17	42	55	221	29	41	01
C/R R.O.										180	04		

Eastern Standard time of Observation

Correction for time zone

Greenwich Civil Time

Greenwich  $\mp$

{ White page (hours)  
Yellow page (Minutes/Secs)  
Total

Longitude of Observation

Local Hour Angle  $\textcircled{1}$

Latitude of Observation  $\textcircled{2}$

Sun's Declination, at nearest hour, white pages

Code Code correction Yellow pages

Sun's Declination  $\textcircled{1}$

Tan.  $\delta$

Cos.  $\phi$

Cosec.  $t$

Product  $\textcircled{1}$

Sin  $\phi$

Cot  $t$

Product  $\textcircled{2}$

Treated as + COT. A  $\textcircled{1-2}$

In First Quadrant Azimuth of Sun A

Angle Sun to reference line

Azimuth of reference line

H.	M.	S.	H.	M.	S.	H.	M.	S.
17	37	00	17	40	24	17	42	55
5			5			5		
22	37	00	22	40	24	22	42	55
0.			0			0		
146	25.4		146	25.4		146	25.4	
9	15.0		10	06.0		10	43.8	
155	40.4		156	31.4		157	09.2	
-82	06.8		-82	06.8		-82	06.8	
73	33.6		74	24.6		75	02.4	
45	53.8							
-13	21.6							
-0.237527								
.695955								
1.042626			1.038195			1.035053		
-0.171354			-0.171622			-0.171108		
.718086								
.295075			.279017			.267202		
.211889			.260358			.191874		
.384243			.371980			.362982		
$68^{\circ}59'$			$69^{\circ}36'$			$70^{\circ}03'$		
$39^{\circ}57'$			$40^{\circ}34'$			$41^{\circ}01'$		
S $29^{\circ}02'$ W			S $29^{\circ}02'$ W			S $29^{\circ}02'$ W		

This sequence gives the least number of transits for three individual observations and a good instrument man requires about a total of five minutes to complete an observation. Time can be picked up at approximately the following frequencies.

- 2.5mgc. WWV US Bureau of Standards
- 5 mgc. WWV US Bureau of Standards
- 10mgc. WWV US Bureau of Standards
- 7.5mgc. Dominion Observatory

Latitude and longitude are taken from the local map sheet.

Note: If adequate latitude and longitude cannot be obtained in this manner, bracket the sun for altitude and azimuth, this of course, increases the computations but may still be more convenient than a polaris observation under some conditions. Try to observe when the

sun is at least two hours or more away from the meridian to obtain a well-conditioned P.S. Z. triangle, and close to the horizon is the most desirable position.

We use the American Nautical Almanac issued by the U.S. Naval Observatory and circulated by the U.S. Government Printing Office, Washington, D.C.

We rearranged the old basic cosine law of spherical trigonometry so that no complementary angles need be derived. Our formula is:  

$$\text{Cot } A = \text{Tan } \delta \text{ Cos } \phi \text{ Cosec } t - \text{Sin } \phi \text{ Cot } t.$$
 Azimuth A is measured east or west from south. A more convenient or faster arrangement might be devised and time is of the essence on these small private jobs but a computation, such as this, using a calculating machine, can be completed in fifteen minutes by a good computer.

PROCEEDINGS OF THE BOARD OF EXAMINERS

The Board held two meetings during the second quarter of 1959, on April 3rd and June 15th.

At the April meeting the chief item was the consideration and approval of the March 1959 examinations as prepared by the individual examiners and compiled by the Secretary. Summarized results of the Intermediate Examinations are:

Passed .....	8
One supplemental .....	9
Two supplemental .....	6
Failed .....	<u>18</u>
Total	41

In addition twenty candidates tried a total of 26 supplementals. They were successful in 21 subjects and failed in five.

The corresponding figures for the Final Examinations were:

	<u>Pt. I</u>	<u>Pt. II</u>	<u>Pts. I&amp;II</u>
Passed	22	19	5
Supp's	8	9	1
Failed	4	6	4
Totals	<u>34</u>	<u>34</u>	<u>10</u>

In addition seven candidates passed supplemental examinations, four will be required to re-write supplementals.

Two resolutions were passed changing certain regulations of the Board. The first of these reads as follows: "That the rule giving full credit for subjects in which the candidate obtains a mark of 80 per cent or greater, although failing to pass the examination, be revoked, and the Secretary be instructed to advise students who are presently carrying such credits from previous examinations that this former rule will be honoured in their case for the September 1959 examinations only."

The second resolution was: "That a candidate will be permitted to try a supplemental examination once only, and if he fails in this attempt, he will be required to re-write all the subjects of the examination of which these supplementals are a part, and the Secretary be instructed to bring this regulation to the particular notice of students who are now carrying supplemental subjects