Transit Rule vs Compass Rule

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It seems to me that we are probably using co-ordinates in the solution of our survey problems more than was common ten years ago. In fact, when I wrote my intermediates in 1957, my knowledge of co-ordinates was very limited and their use was reserved almost exclusively to plotting. Because of their widening importance I have gradually increased their use both at school and in the intermediate examination, "Mensuration B". I am happy to see that each set of examinations shows a better understanding of the use of co-ordinates but most students cannot handle them efficiently.

Balancing Techniques

As we all know, before a co-ordinate value can be placed on a point, the residual error lying each side of the point must be eliminated. To do this we must use some kind of balancing technique. I have found that the student of today is just as naive as I was in the relative merits of the "compass rule" and the "transit rule". A question designed to illicit an intelligent response on this topic nets me nothing more than memorized quotations. This would not be too bad if these quotations were based on fact but through my own reasoning and research I can find nothing to prove that the transit rule is good if the angles are stronger than the sides, nor can I see that the compass rule was properly thrown out with that instrument that lent it its name.

To summarize the compass rule:

Total Error in Departure (or Lat.) = **Particular Error in Departure (or Lat.)**
Total Perimeter   Length of Course

Compass Rule Better

The purpose of this piece is to prove that the compass rule is the better method of balancing and the transit rule should not be used if a true mathematical solution is sought.

The following diagrams (see page —) illustrate a closed loop AB1C1A1 where A and A1 are in fact the same point. The distance A1A is the error which must be distributed into the loop. The points B and C are the revised locations of B1 and C1. If all things are equal throughout or if angles and distances are measured with equal accuracy, then the most probable bearings and distances would be found by joining the points A, B, and C.

Diagram (a) illustrates the error A1A distributed into the rest of the loop by moving in the direction of the error a distance proportional to the length of the loop at that point. In other words the distance B1B is to distance AB as A1A is to the total perimeter. Because the bearing of the error is constant throughout, then the latitude and departure errors are also proportional to the perimeter. This then is the "compass rule" in action. Because it is mathematically sound, the revolution of the figure to give it different bearings will not change its shape.

Diagrams (b) and (c) illustrate what happens when the error A1A is distributed into the loop by the transit rule.

Because line AB in diagram (b) has no departure, there can be no correction at B and all residual error must be put into point C. Diagram (c) shows the same error distributed after the figure has been rotated 45°. Certainly this should be proof enough that the transit rule should be forgotten as soon as possible.

It seems to me that in land surveying we must keep our minds on what the numbers represent and not rely too heavily on ultra sophisticated balancing techniques. In fact, in this day of fantastic electronic marvels we must remember that there is still something to be said for "seat of the pants" balancing.

The Evolution of A Canadian Council
(continued from page 25)

a) Approval in principle of the formation of a Canadian Council of Professional Surveyors in co-operation with the C.I.S.;

b) Assessment of four dollars per active member to contribute to the development of such an organization;

c) That the results of (a) and (b) be submitted for the April 25, 1973 presidents' meeting, with a tentative date for completion of April, 1974.

Further Motions passed were:

1. That in the development of the Canadian Council concept the C.I.S. be a participant;

2. That the next fall meeting of the Presidents of the Provincial Land Surveyors Associations / Corporations be held at Winnipeg, Manitoba.

The assessment fee in the resolution above was determined by averaging out the suggestions as to the amount of money required with the knowledge that $2,000 would be required for incorporation and that office space and secretarial help would be shared with the C.I.S.

And so fellow land surveyors, you have a thumbnail sketch of what has led to the formation of a Canadian Council — hopefully many of those responsible for its path to this point will be at our own Annual Meeting. Your Presidents, who attended the meetings, feel this is a step ahead for our profession. Ontario has always been a leader in progressive thinking and without our support a national organization would have little chance of survival. We would ask the membership to give this the favourable support it deserves.
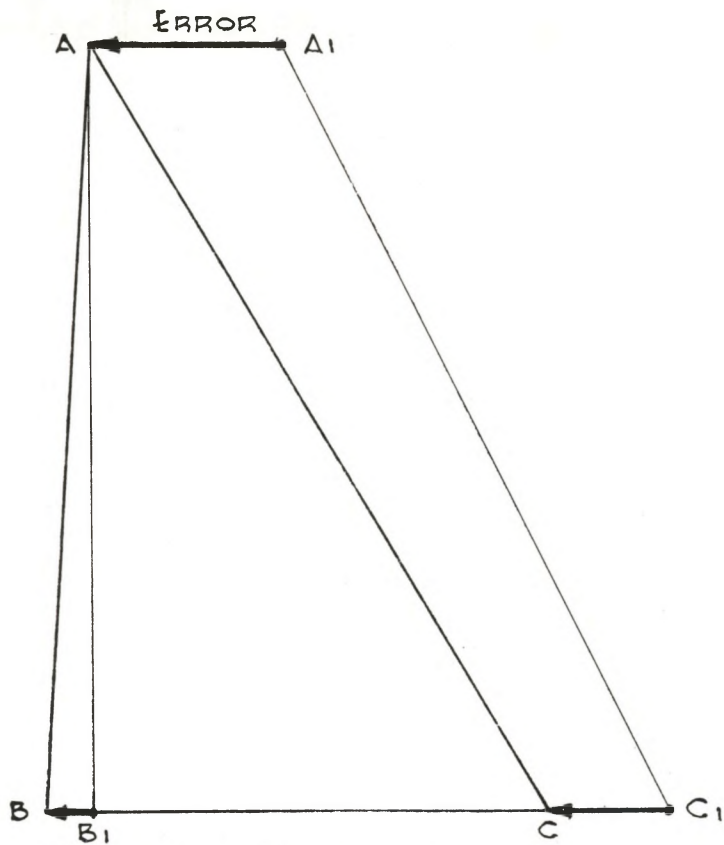
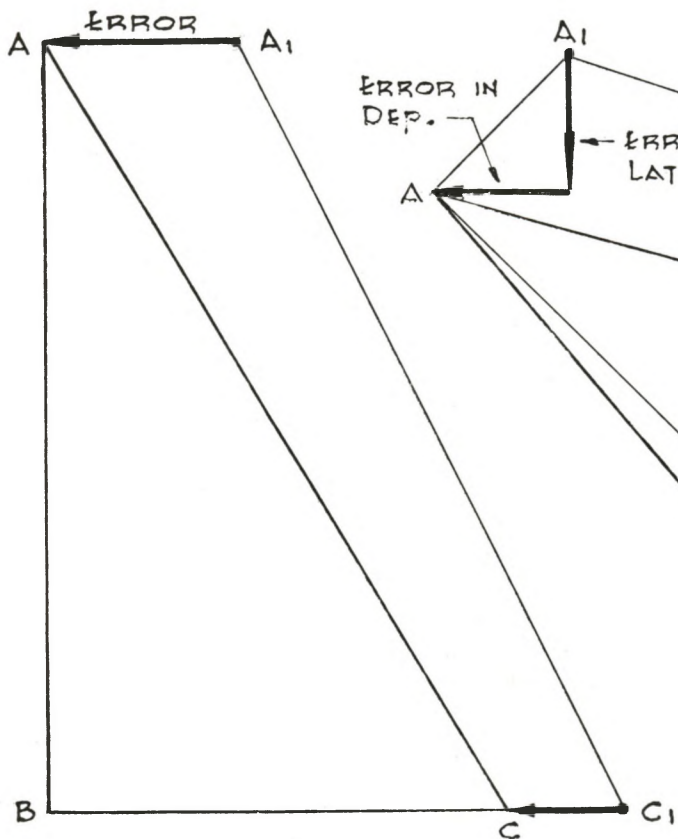DIAGRAM (A) · *Error distributed by compass rule*
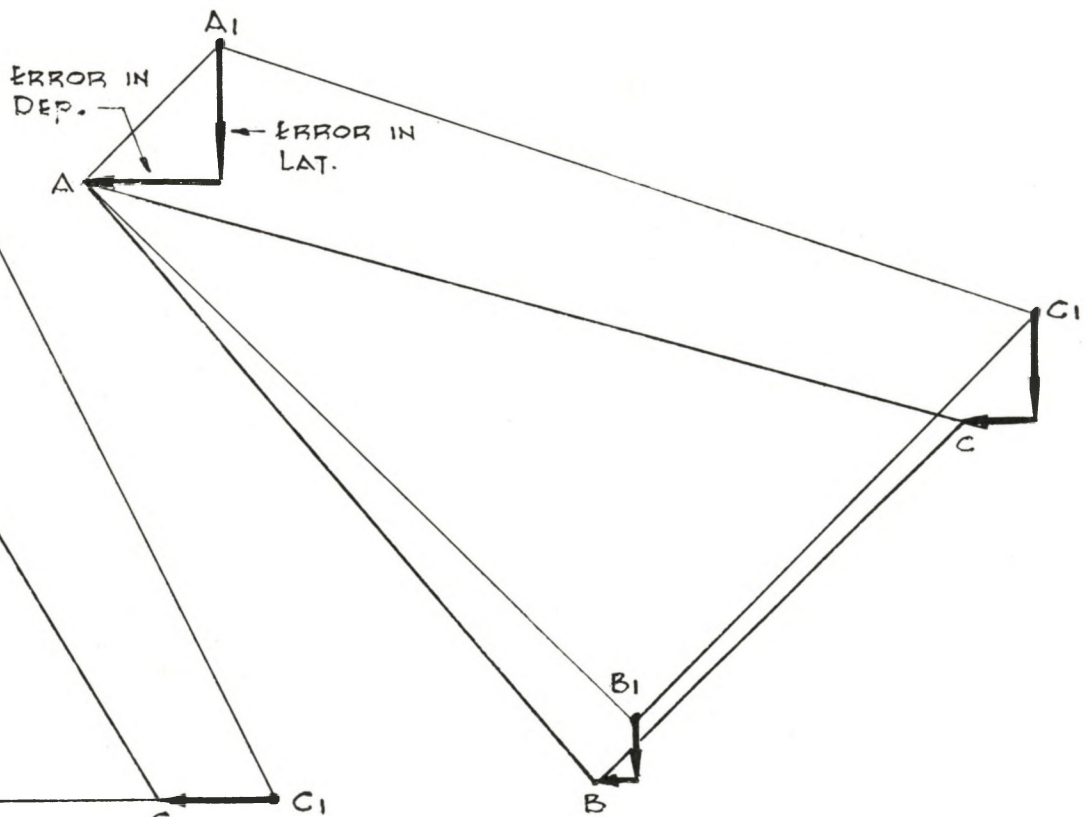

DIAGRAM (B) · *Transit rule*

DIAGRAM (C) · *Transit rule*