CLOSING SESSION

T.J. Kukkamäki, President of the International Association of Geodesy (IAG)
G. Teleki, Chairman of the Scientific Organizing Committee
E. Tengström, Convener and Chairman of the Local Organizing Committee

T.J. Kukkamäki: Dear colleagues! I have been asked to preside this closing session, and it is a great pleasure for me to to this, because of your fine work here. Now I ask the Chairman of the Scientific Organizing Committee, Dr Teleki, to give us his opinion about the work of this symposium and its results.

G. Teleki: Mr Chairman, dear colleagues! First I would like to stress that I am full of a great number of impressions. Therefore, it is practically impossible for me to give a critics, complete and real, concerning this symposium. Please, allow me, therefore, and professor Tengström to summarize the results of this symposium for the proceedings (see encl. addendum). I believe that the symposium covered all parts of refractional influences. We had several very interesting review papers, which are very useful for everybody I suppose. We obtained a good information about the present state and the future about this kind of investigations. I suppose that our proceedings will be a very useful handbook for every researcher in refractional problems. I must say that I am completely satisfied with this symposium. I expect now critics and your reactions. The symposium was very intimate. If I remember, at least 40 participants, but 40 very good participants were here. Discussions and contributions were very effective. Therefore, I can conclude that this symposium was very active. We permanently discussed about the cooperation between geodesists and astrometrists. Why must we cooperate? Allow me to stress the reasons. We need some recapitulation, connected with this document we must send to the Executive Committees of our unions. First of all I can say, that the atmospheric effects on astrometric and geodetic observations put a limit on the real accuracy. Therefore, it is a common problem, which I think we must solve together. The second common field is the latitude - longitude and azimuth observations in geodetical astronomy, or earth rotation in astrometry. Therefore, it is the same problem we investigate. The third question is the determination, or rather the elimination, of refractional influences at a star observation. We have this kind of needs in both geodetical astronomy and astrometry. The fourth common field is the modelling of the atmosphere, not only the whole atmosphere.

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In astrometry we also need a modelling of the atmosphere very near to our instruments. Therefore, it is really a common problem. And I can notice that the prevention is also a problem, common for you in geodesy and for us in astrometry. No discussion that we really need meteorological help. Therefore, I am completely satisfied with the resolutions, because the resolutions no 5 and no 8 recommend the establishment of a commission, which includes not only the astronomers and the geodesists, but also meteorologists and physicists. So I expect that this commission will be very useful for us. At the end of my speech, I would like to express our thanks to all speakers and participants in the discussions. And also allow me to express your and my own thanks to the Local Organizing Committee, especially to professor Tengström.

T.J. Kukkamäki: Thank you, Dr Teleki, for this summarizing of our work. We have now the next point in our agenda. That is accepting of our resolutions. I ask if you at this plenary session of our symposium accept the resolutions. I can see, from your raised hands, a quite clear majority. So, the resolutions are accepted by the symposium.
I think we have made a valuable work here, and we see that black on white when we read our resolutions. I would like to mention one of the resolutions, namely no 8, where we say that this joint work of astronomers and geodesists must be continued. That will be made at a more official level when we recommend the IAU and IUGG (IAG) to establish a special joint commission to take care of this kind of research. On behalf of the International Association of Geodesy, I thank again the Scientific Organizing Committee, especially its Chairman, Dr Teleki. On behalf of my association and all the participants, I thank the organizers of this meeting, which is one merit among other great merits of professor Tengström. We have to thank him and his staff, not least miss Ohlsson, the secretary. She has made a wonderful job in arranging our business, travelling, accomodation etc. With these words I close this formal session. There is, however, still one point, which is very pleasant for us, namely Dr Angus-Leppan will tell us something which will happen next year.

P.V. Angus-Leppan: informed, as chairman of the Organizing Committee for the General Assembly, about the meeting of the XVII General Assembly of the International Union of Geodesy and Geophysics, to be held in Canberra, Australia, December 2-15, 1979.

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ADDENDUM

Dr Teleki asked, during his speech at the closing session, for a demonstration of the common opinion of the chairmen conducting the IAU working group WGAR and the IAG special study group I.42, as regards the results of the symposium work.

After this symposium, Dr Teleki and professor Tengström have concluded:

1) That all papers and discussions were of great value for planning the future work.

2) That all the scientific resolutions passed, adequately describe various important areas of research to be considered by adequate bodies.

3) That specifically most discussions have reflected the opinion that the ultimate goal of all investigations of refractional effects in astrometry and geodesy, should be to find methods of deriving accurate corrections, due to these effects, involving a minimum number of meteorological parameters, derivable from simple and feasible observations at - or close to - the actual time of measurement.

4) That the participants agreed that, in order to minimize the influences of refractional effects in astrometry, the prevention - the best possible location of instruments, most adequate pavilion and observing methods, etc. - is recommendable.

5) That the predominant part of the participants envisaged the dispersion method - although not yet sufficiently tested in the field for absolute significance - as the only way of reaching the goal in 3), at least at present

6) That, furthermore, the contributions to the discussions around astronomic, parallactic, photogrammetric (cosmic) and terrestrial refraction, have demonstrated

a) that improved atmospherical models might - more or less - satisfy long time researches, e.g. the stellar catalogue work and also the needs for certain investigations in satellite geodesy, but

b) that such models should be avoided and replaced by other methods - especially in astrogeodetic work, e.g. in low elevation stellar triangulation in photogrammetry and in terrestrial geodesy (including precise levelling) - namely such methods with which the effect of the actual instantaneous local atmospherical state can be accurately derived.

7) That interesting papers and interferences from various participants have shown that, when the effects of micro-turbulence on refraction for short observation times and the behaviour of electromagnetic wave propagation under such conditions are better known for various atmospheric conditions, three ways of eliminating such effects should be

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considered, namely
a) at first, by measuring during clearly settled non-turbulent conditions,
b) second, by means of appropriate spatial and/or time averaging of signal observations,
c) third, to use statistically computed corrections to eventually minimize the effect of turbulence in the results.

8) That the participants, noting the fact that micro-turbulent atmospherical effects on refraction are also of interest to meteorology, recommend steps to be taken for storing astronomic and geodetic short-time observational data concerning refraction, so that they could be used by the meteorologists in their studies of atmospherical turbulence under various thermodynamical conditions.

9) That the role of air humidity for refraction and wave propagation was considered as being important to study further for different regions of the electromagnetic spectrum.

10) That the participants agreed on the needs for improving methods and techniques for determining refraction-free vertical angles in local geodynamical investigations, to be used as supplementary information beside ranging and levelling.

11) That the participants, though expressing certain doubts concerning the future possibility of detecting the so-called fore-runners of electromagnetic waves, still realized the importance of further studies of such means to observe directly refraction-free quantities in astronomy and geodesy.

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