APPENDIX B. ABOUT THE ‘SNAGS’ OF THE PROBLEM


- As a doctorate I proposed to Heisenberg no theme from Spectroscopy but the difficult problem of Turbulence, in the hope, that WENN IRGEN-DEINER (if anybody), would solve this problem. However, the problem is until now not solved. A. Sommerfeld (1942), *Scientia*, Nov./Dez 1942.


- It remains to call attention to the chief outstanding difficulty (i.e. turbulence) of our subject. H. Lamb 1927 *Hydrodynamics*, p. 651.

- I am an old man now, and when I die and go to Heaven there are two matters on which I hope for enlightenment. One is quantum electrodynamics and the other is the turbulent motion of fluids. And about the former I am rather optimistic. Sir Horace Lamb 1932 as quoted by S. Goldstein 1969, *ARFM*, 1, 23.


- It is at this point that the study of turbulence does prove to be an exception: the applied physics involvement is almost completely absent. In view of the extraordinary practical importance of turbulence ..., this is
quite astonishing. Yet the reason for such apparent neglect is easily found. Quite simply the fundamental problems of turbulence are still unresolved. D. McComb 1990 The physics of turbulence, Oxford Univ. Press p. vii.

- The entire experience with the subject indicates that the purely analytical approach is beset with difficulties, which at this moment are still prohibitive. The reason for this is probably as was indicated above: That our intuitive relationship to the subject is still to loose – not having succeeded at anything like deep mathematical penetration in any part of the subject, we are still quite disoriented as to the relevant factors, and as to the proper analytical machinery to be used. Under these conditions there might be some hope to “break the deadlock” by extensive, but well planned computational efforts. J. von Neumann (1949) Recent theories of turbulence” - A report to Office of Naval Research. Collected works, 6 (1963), 469, ed. Taub., A. H., Pergamon.

- ...the absence of a sound theory is one of the most disturbing aspects of the turbulence syndrome. R. W. Stewart.


- ... we should not altogether neglect the possibility that there is no such as thing 'turbulence'. That is to say, it is not meaningful to talk of the properties of a turbulent flow independently of the physical situation in which it arises. In searching for a theory of turbulence, perhaps we are looking for a chimera, P. G. Saffman 1978 Problems and progress in the theory of turbulence, Lect Notes in Phys., 76 (II), 276.

- ... I just cannot think of anything where a genuine prediction for the dynamics of turbulent flow has been confirmed by an experiment. So we have a big vast empty field. P. G. Saffman (1991) in The Global Geometry of Turbulence, NATO ASI Ser. B 268, ed. J. Jimenez, p. 349, Plenum.

- Turbulence was probably invented by the Devil on the seventh day of Creation when the Good Lord wasn’t looking. P. Bradshaw 1994 Experiments in Fluids, 16, 203.

- ... less is known about the fine scale turbulence ... than about the structure of atomic nuclei. Lack of basic knowledge about turbulence is holding back progress in fields as diverse as cosmology, meteorology, aero-