

Joseph Agassi

SUMMARY OF AFOS WORKSHOP, 1994

It is a great honor to be invited to sum up the proceedings of this, first AFOS workshop. I do not quite know how to do it. It is difficult enough to work within a well-established framework, but I do not think there is an established framework for this. One of the most important philosophers of science of the century, Michael Polanyi, said that science is a system of workshops, since the master scientist, like the master artist, does not know what exactly makes his workshop what it is, as his knowledge is tacit, unspoken. Certainly there is tacit knowledge in every activity, but for my part it seems to me that the workshop mentality is the opposite of what Polanyi describes, as it is fluid, and as the leadership of the proceeding keeps changing so that junior members of a workshop can have their day and make a contribution to the goings on, as the agenda can alter as a result of the interaction of members, of the group dynamics. This, I think is the spirit of science, and it is described in a few works where some historical workshops are described. Let me mention two studies that reflect it, Robert Jungk, *Brighter than a Thousand Suns*, and *Einstein and the Generation of Science* by Lewis Feuer. The main point to stress here is that the group dynamics is of great significance, and whatever it is it must be in friendly spirits. I think I need not say more on this as to our workshop: the friendly spirits were evident, and the procedures were developed satisfactorily as we went along. Since the discussions centered around papers, let me say that some of the papers were unpanned, on which more soon, and that some of the members here contributed significantly even though they did not read papers. I refer especially to the senior members of the workshop. I know that senior people do not particularly like to be referred to as seniors, so let me mention here Bertrand Russell's terrific "How to Grow Old", where he says, seniors can stay young by staying involved in the problems of the young. In this sense we are all young here.

The main things to say about our workshop is, first, that it took place in terrific surroundings, in ideal conditions – of isolation plus excursions. The first task I have, therefore, is to express the gratitude of the membership to the donors, the organizers and the staff. Second, the workshop takes place under the auspices of AFOS. We can all be proud of sharing the privilege of being members of the first AFOS workshop, thus contributing significantly to a new and significant tradition. We have devoted a significant session to the aims and character of AFOS and we agreed that it maintains the scientific attitude and strives for a scientific world-view, and that it should have the unusual task of maintaining high standards while staying as open as possible. As to openness, we agreed that there is no room in our midst to obscurantism, even of the fashionable sort, though we will not close our gates to obscurantists who are willing and able to have interesting dialogues with us. As to the maintenance of high standards, the most obvious way of trying to do so is by writing on one's gatepost what Plato wrote on the one to his Academy: no entry for those not expert in mathematics. By demanding ever more background knowledge we may try to raise our standards. This was tried in the scientific world of the Post-World-War-II period, when nuclear physics became so prestigious and lucrative and the model of the oxymoron of combined scientific character and secrecy. We want to start differently, requiring high standards but no specialized knowledge.

How exactly is not clear, and our little workshop was a minor experiment in this respect. We tried to be explicit, to procure explanation as much as we could of whatever item of background technical information we were using. I do not wish to present an idealized image of the workshop. There was generally too much air of familiarity with some rich background material. Too many times we mentioned some texts as such that we all are familiar with and approve of, especially some of Prigogine's popular works and Rene Thom's. Had we had more time and more ability, we would institute talks on these writers of the kind we had about chaos. There is room for improvement, and the next workshop will be better, we all hope.

There was, particularly, trouble with the contingency that wished to speak of synergetics. Most of us did not and still do not know what they are saying, despite the fact we were also given some published material to help us with the task. It is a cause for pride that the situation was taken as a challenge and that young members of the workshop volunteered to present the essentials of the theory of fractals, of self-similar functions and of the main self-similar functions that are solutions to some non-linear differential equations that are central to the theory of chaos. There were a few short impromptu expositions, and these were excellent; unfortunately, some of us

were too shy to participate as actively as workshops require.

The efforts to understand the basic of the mathematics involved should have helped us understand what our synergeticists were trying to say, and, indeed, when the next talk on synergetics was given the speaker referred to the background material as helpful, but after covering some familiar background material he went over to the material specific to that group then the others lost him. Pity.

In addition to the workshop on synergetics, to which I will return last, we had a few more workshops. We had one, of Adam Grobler, on the views on science and on rationality of Larry Laudan as an effort to improve upon other, better known ideas on the topic, and on the shortcomings of these ideas and on how these may perhaps be overcome. As this discussion was rather abstract it was wisely complemented by a broad outline of the history of physics in the last three or four centuries. I will not try to summarize it as it was already too concise for my taste. We also had a workshop on data and phenomena with a special reference to the history of the discovery of the phenomenon of continental drift. I cannot avoid mention the terrifically clear and concise and interesting presentation by Matthias Kaiser of that chapter in history.

We had a workshop on the social background of science and its interactions with the methodology of science, a topic also covered in the already mentioned discussion of phenomena. We had a lively discussion of mechanized heuristic, of the sociology of science and its strong interaction with the development of science in accord with chaos theory, of the ethics and the methods of science, and of both the Warsaw-Lvov school of logic and the Vienna Circle each in its peculiar social settings. We heard a trailblazing description by Sven Aerts of measurement interacting with the measured not only in quantum mechanics, but also in classical mechanics and in social science.

Finally we had two talks of Ryszard Wójcicki, one by Paul Humpreys and one by Mauricio Suarez. The last two, this afternoon, were on Gierie on realism that I will not summarize for want of time despite the lively debate it generated; the latter was on computational empiricism that depicted the changes that modern powerful automatic computational methods have introduced into the methods practiced in science. It certainly was new to me and I found it refreshing and exciting.

Let me discuss Ryszard's papers a bit, as he was not clear about his aims in presenting them. The first was his own version of the history of the theory of science in the twentieth century. He took off from the views of the Vienna Circle of science and he claimed that they were concerned with the

problem of demarcation of science, that their researches on this were failures, though important ones nonetheless, and that they were superseded by the new theories that take into account when discussing science, its history, the psychology and the sociology of scientist, and so on. He also said that the Vienna Circle was important despite its failure, but he did not explain. He also included Popper in that circle, which is standard if to my mind unacceptable.

I find this disturbing. The Vienna Circle saw itself as a crusaders against metaphysics, and this should be mentioned in respect for people's opinions of what they do even we do not share these opinions. Also, the Circle was concerned not only with the problem of demarcation of science, which, I agree with Ryszard, is not the most important, but also with the problem of induction which still is with us: how do we gain theoretical knowledge from experience? Popper's answer, following Einstein, is, by empirical criticism. This answer, which seems to me to be central to the progress of methodology in our century, was ignored by the whole profession, as was Popper himself. He was first recognized officially by scientists, not by philosophers, and these still have the problem of what to do about past injustices to him. They try to gloss over this question, but they will fail.

Ryszard's second paper is a presentation of a new, semi-formal theory of semantics, i.e. of meaning and truth. The background for this is a dissatisfaction with the classic, standard theory of Tarski, and I cannot go into this now. The paper displays a very interesting and very novel approach, in which, contrary to Russel and the whole of the analytic tradition, but utilizing vaguely the idea of possible worlds, facts can be said to obtain or not to obtain, where these decide respectively the truth or falsity of their descriptions. If this essays is not found at once grossly defective, and I for one cannot predict on this matter, then it is going to be cited a lot and for a long time, and we will say, I was there when it was first read.

I feel the need to say more about the workshop on synergetics just because we all felt so frustrated about it, the advocates of the ideas of synergetics who come from the former Soviet Union and the rest of us. Frustration should be taken as a challenge as long as there is good will, especially since, as was noticed, the frustration is in part at least the result of their isolation that is now over and this invites taking advantage of the new contacts. Let me say a few words on the matter at hand before bringing this summary to a close and opening the workshop's floor for discussion.

Synergetics is a collection of ideas and research techniques related to chaos theory, guided by the hope that the new mathematical technique will help progress in efforts to overcome the standard problems associated with

self-regulating systems that were left unsolved by the older cybernetic techniques. Somehow the feeling was conveyed that the spokespeople for synergetics here felt vindicated every time an assertion from synergetics or from chaos theory was conceded. Once there was even the impression that our synergeticists even claimed credit for the fact that some physicists have invented a maser apparatus of which they received Lenin prize. This may be just an impression, and perhaps not all of us share it, but we owe it to our friends to tell them that some of us did share it and that they will be better off trying to prevent giving such impressions. But let me speak of the maser apparatus itself.

Our synergeticists stand out also in that they represent clinics that use the apparatus in question to cure a variety of illness in a method that is a variant of the traditional Chinese acupuncture method that I will not discuss. Two claims are made relative to this technique or set of techniques that they advocate. First, that it is an expression of a new theoretical synergetic breakthrough, and second that it works. It is clear to me that on the assumption that it works there is no theoretical breakthrough here, much less a physics of the alive and a quantum medicine. These are just fancy names. the basis for this is the idea of quantum or non-quantum resonance. Now a resonance is a localized phenomenon, like the sound on the radio that is heard only when its dial is at a certain position, but not all localized phenomena are resonance, for example, pain. The use of the word "resonance" here is sheer metaphor. In the first lecture here on the topic we were told that the word "non-linear" is used in a sense non identical with that in the expression "non-linear differential equations" Let me stress that I have no objection to metaphor - only to pretense that a metaphor carries more information than it does.

Let me say, then, a word on the question of the work of the clinics they represent as alternative medicine. I think alternative medicine serves us an important function, and it is regrettable that it is not better presented and developed than it is. Established medicine is too powerful and it is in need of public control and checks, an alternative medicine is the natural system to prompt this control. Though established medicine began in earnest with the development of hygiene and nutrition which are "soft", the tendency of established medicine is towards preferring "hard" techniques. No doubt, physical exercises and proper diet are better than open-heart operations if and when they achieve the same results, yet usually they come too late for patients who are carted to the operation theater. Yet there is no doubt that in matter of giving birth obstetricians have earned the severest censure that they received from the feminist movement for their hard tech-

niques, especially for their unnecessary use of cesarean sections for patients who are properly insured. There is even the matter of surgeons preferring to date mastectomy over lumpectomy when at best the advantage of the severe method over the less severe one is still not empirically corroborated. There is also the matter of over-diagnosis that the literature provided to us by our synergeticists mentions. All in all, the methods of alternative medicine, including acupuncture, including the new variant of it offered by our synergeticists, are "soft" and so often less harmful than the "hard" techniques. This is particularly so since the clientele of the alternative methods, unlike the clientele for traditional medicine, are people who despaired of established medicine, so that there is no serious risk due to some mis-diagnosis of an illness which urgently invites some surgery.

I apologize for the lengthy digression into alternative medicine, but I felt that this is some vindication of our synergeticists, and I felt a need to be as conciliatory as I can – not enough, I am sure, but it is the best I can, since I cannot honestly endorse their claim for scientific status for their techniques. If our synergeticists are not discouraged by the ungenerous reaction of some of us, myself included, and if they advance some new ideas, then we all may meet again in some regional AFOS conference in the near future, and with less frustration and more exchange.

Let me close this presentation by reminding you that I found it necessary to dwell on the dark side of our workshop, as becoming critically-minded people, but that the bright side was decidedly the more significant and we all come out of the workshop with a positive sentiment, ready to go to the conference in Warsaw and tell the other AFOS people we will meet there that it was a pity that they missed an exciting experience.