Sokolsky, V. N.

[One of the very important problems...]

Organon 1, 86-87

1964

tombés dans l'oubli, et partout des ruines, la mort. Le pire n'était pas le défaut des savants, mais de la connaissance de l'écriture en général. Et quand même le fil n'était pas arraché...

Aujourd'hui, après des siècles de recherches et d'études, nous sommes arrivés presque au sommet (selon notre jugement) du développement civilisatrice. Nous savons néanmoins que dans notre civilisation, si éloignée dès les premières, il y a beaucoup de succession des civilisations anciennes. Et même, est-ce que nous connaissons bien et tirons tout le profit de cette succession? Aussi l'histoire des sciences et de la technique doit chercher, analyser, intérpreter des liens les plus étonnants et les plus instructifs entre la civilisation contemporaine et toutes les civilisations passées, et doit le faire d'une manière encore plus profonde.

V. N. Sokolsky

One of the very important problems in the history of science is the interaction of science and technology, their influencing upon each other, the character of their mutual ties. The significance of this problem particularly increases in the present days when we are witnessing the greatest scientific and technological revolution linked with the mastery of nuclear energy, with the penetration into the mysteries of the microcosm and the depths of the macrocosm, with the automation of production as well as with the replacement of logical functions of man by machines — when science begins to become a direct productive force, a direct part of production.

In his report, Professor Daumas in principle rightly emphasized that technology — at various stages — constantly stimulated the scientific progress, the character, however, of the mutual relations between science and technology was changing considerably.

As a matter of fact, technology was at first developing quite independently, without being materially influenced by science. Later on, technology began not only to stimulate the development of science, but also to be, inversely, influenced by the latter, this influence being initially not very strong. In the present days, finally, the various domains of science and technology are so closely interwoven that it already becomes very hard, and at times simply impossible, to examine their development independently of each other.

Let us examine — as an example — the development of the rocket technique. Although the history of powder rockets covers many a century and although, during that period, the investigators, active in various

countries, worked out a great number of very curious pyrotechnic rockets (including multistage rockets, rockets with deltoid wings, rocket sheaves, etc.), none the less all the improvements introduced into their design were — till the end of the XVIIIth century — based chiefly upon conjectures and intuition of individuals working in that domain.

All the results were obtained in an empirical way and were based not on theoretical but on purely experimental data. At the beginning of the XIXth century there existed neither the theory of explosive compounds, nor that of rocket design, nor that of their flight.

This is explained to a great extent by the fact that the rockets were used — till the end of the XVIIIth century — exclusively for the arrangement of fireworks and for signalling. Such being the use of rockets, the demands made to them were not particularly high. The results obtained by the artisans-pyrotechnists in the course of numerous experiments were quite satisfactory, and a need of elaborating the theoretical foundations for the rocket technique was hardly felt.

However, at the end of the XVIIIth century in India and since the beginning of the XIXth century in Europe, the rockets began to be employed again as a fighting means. It became then necessary to pay a greater attention at their quality and to make new demands of the specialists working in that field.

No wonder, therefore, that it was precisely in the XIXth century that in a number of countries there appeared rockets whose creators — W. Moore, Montgéry, K. I. Konstantinov and others — were trying to lay scientific foundations for the rocket construction and for the theory of rocket flight. In the past centuries, however, one did not manage to solve that task. A great experimental material, gathered in many countries, did not obtain satisfactory theoretical generalizations and till the end of the XIXth century the theory of rocket flight was not created.

It is only at the turn of the XIXth and XXth centuries that this task could be successfully solved by K. E. Ziolkovsky who strictly scientifically substantiated the practicability of interplanetary flights by means of rockets and gave the design formulas of their flight. Ziolkovsky's works initiated the new branches of science: astronautics and rocket dynamics.

In the present-day development of rocket design, finally, science and technology are so closely interwoven that it is difficult to separate them now.

In conclusion, I wish to express my desire that the problems of the mutual relation between science and technology may find — within the history of science — the same close reflection that is found by them in life itself.