

LIFE OF SCIENCE

AMONTHLY DEVOTED TO THE SCIENCE OF SCIENCE

Editor: MIECZYŚLAW CHOYNOWSKI

VOL. 1

MAY 1946

NO. 5

THE SCIENCE OF SCIENCE PROBLEMS

by LUDWIK FLECK

IT IS extremely interesting to observe how scientists, who devote their entire lives to a segregation of the illusions from reality, are yet unable to discriminate between their dreams of science and the science as it really is.

We cannot regard science solely as a system of propositions or thoughts. It comprises complex cultural phenomena, which were perhaps individual before, but which have a collective character to-day. Science consists of separate institutions, separate human beings, separate factors and happenings. It comprises written opinions, unwritten customs, it has its own aims, methods, traditions and development. An equipped mind and a manual dexterity are part of it. It possesses its special organizational structure with its own hierarchy, its own means of communication and collaboration, its organizational judgement, its public opinion, press and congresses. Its relation to the other phenomena of cultural life, to the community, the state, etc. is quite distinct.

Logical structure cannot be regarded as a criterion of science, because systematic errors sometimes lead to more logical conclusions. A deduction starting from fundamental elements or from elementary propositions cannot be regarded as a criterion of science, because such elements do not exist. It depends entirely upon our judgement what elements we shall consider as fundamental, just as it is left to our decision, which two structures we shall regard to be identical. The universal agreement is not a criterion of science either because such a thing does not exist practically, there is only an agreement of „our team“, and this may be based on an error too. Every team of similarly thinking men denies competency of judgement to all outsiders. We cannot regard the putting into practice as a criterion of science; thanks to the harmony of illusions erroneous opinions may also be put into practice. Many people got rich with the help of alchemical gold, it is even reported that wars were financed by such gold.

The only criteria of science are the individual characteristics of scientific knowledge, namely: the historical singleness of their development, the structure of corresponding team thoughts and the characteristics of the scientific style of thought. Only by means of comparison, within the limits of the general sociology of thought, can we get to know the characteristic traits of scientific thought.

The science of science is a distinct science, based upon observation and experiment, upon historical and sociological research. It is part of the science dealing with the styles of thinking.

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A CONTRIBUTION TO THE DISCUSSION ON THE ORGANIZATION OF POLISH SCIENCE

by ADAM MALICKI

TWO PLANS are now being discussed in connection with the organization of Polish science, namely the plan of transforming some of the Polish universities into higher professional training schools, and the plan of increasing the number of research institutes outside the universities. The experience of the past has shown us that the acquiring of information covering a certain subject, is far less valuable to students than the mastering of methods of scientific investigation and the solving of various problems, and that is best achieved by holding intercourse with creative scientists, by taking part in discussions and by one's own scientific research work. If higher schools are to give to their graduates a really thorough grounding, they cannot decrease their scientific work, on the contrary, they ought to raise it on an even higher level. The Polish universities showed their excellent qualities in the years 1920—1939, and all hasty reorganizational measures might rather injure their smooth workings. Changes, introducing material or spiritual improvements, would be unquestionably welcome for the sake of the students, but restrictions of their scientific work are hardly to be recommended.

We have no need to fear a hyper-production of academic schools in Poland. Every new university means another success of the Polish science, as we had too few universities before the war. The difficulties in filling the chairs of the seven State Universities, existing to-day, could surely be surmounted, and an increasing number of the universities would mean an easier penetration of culture into the provincial districts of the country, and would do away with overcrowded conditions in them.

The universities have a constant afflux of young scientific workers, among whom the process of selection is continually going on. Scientific research institutes are deprived of this selection, and often struggle with personnel difficulties, which even lead them to a state of decrepitude. New scientific research institutes ought to be organized in connection with academic schools; it would mean a great staff economy and an economy of the financial subsidies.

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A CONTRIBUTION TO THE DISCUSSION UPON THE ORGANIZATION OF POLISH SCIENCE

by JÓZEF PARNAS

THE VICTORY of the United Nations has been gained thanks to the considerable help of science, and, with the participation of Polish scientists too, who have worked for all the Allied Powers, while in our own country the enemy was mercilessly exterminating our culture. Poland's most important problem to-day is its reconstruction, which requires the participation of science in it, and therefore both science and scientists should be specially protected by the state and the society.

The present situation of the country and of science makes some limitations in the autonomy of the universities necessary. Chairs should be filled by means of competitions, and the State Scientific Council ought to have the right of deciding what professors should be transferred from one university to another, should a rational personnel planning, having the good of science in view, demand it.

The scientific assistant workers should enjoy a particular protection, they should be enabled to go on with their studies and to go abroad for specialization.

The technical laboratory equipment in Poland is so insufficient to-day, that it paralyzes scientific work. The raising of the State endowments for universities has become an urgent necessity, and the State ought to realize it. We might be able to get valuable help from abroad, and therefore we should have cultural *attachés* appointed at our diplomatic posts, who would remain in touch with the world of science abroad.

From the point of view of material endowment, the conditions of life of our scientific staff are very inadequate, too. This should be bettered as quickly as possible for the sake of science itself.

All research institutes should be under the supervision of the Polish Academy of Sciences and Letters, and their research work should be coordinated by this institution. The State Scientific Council should be reorganized too; it ought to represent all branches of science its meetings should be held more frequently and at regular intervals.

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DIPLOMATICS

by SYLWIUSZ MIKUCKI

DEMOCRACY requires every one to have such political consciousness as to be able to partake in an active and responsible shaping of the destiny of one's country. Such a degree of political maturity may be acquired solely upon a basis of historical thinking, as we cannot hope to understand the present

without knowing the past. The propagation and deepening of historic knowledge are therefore to-day most important. This applies also to some auxiliary disciplines of history, which are less known by a majority of non-specialists, in spite of their importance. Diplomatics are one of them. Documents are the most important sources of history. The diplomatic examines the authenticity of documents. The foundations of that branch of science were laid by the French Benedictine monk Dom Mabillon in his splendid work *De re diplomatica libri sex*, where he defined it as *ars discernendi vera et falsa diplomata*. Without a proper estimation of the authenticity of the documents, without the criticism and interpretation of them, history would be based upon flimsy and unstable foundations.

To-day the diplomatic has become to a considerable degree independent, and it has perfected its methods. It does not only tell us, whether the documents are genuine or forged, it also presents to us their genesis and it judges their importance in connection with the entire cultural life of the epoch they originated in. To-day it is no longer a branch of science dealing with the authenticity of documents, but it also teaches us to respect the importance of the written word in the legal life of the community.

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THE NEED OF AN EXTENSION OF KRETSCHMER'S TYPOLOGY

By EUGENIUSZ BRZEZICKI

IT IS difficult to classify many normal individuals as distinct constitutional types according to Kretschmer's typology, though some of their traits give them a certain schizothymical or cyclothymical mark. I call such individuals *synthymics* generally — if they come near the schizothymical group, they are called *synthymical schizothymics*, if they approach the cyclothymical group, then they are *synthymical cyclothymics*.

Pure cyclothymics can be divided into 6 groups. Here they are: 1. pure synthonics — sociable, genial, emotional; 2. euphorics — gay, lively, excitable; 3. musing types — quiet, sluggish, soft; 4. restrained types — with an inferiority complex, timid; 5. sad types — serious, seeing everything in dark colours; 6. proper phasic types — with fluctuating emotional reactions, serene, sociable, active, or quiet, emotional, passive.

Schizothymics, who are all characterized by autism, super-sensitiveness, and frequently by indifference, coldness or dullness, are divided by me into 4 sub-types. They are: 1. schizothymics of the mimosa type — over-sensitive and dreaming; 2. psychasthenics — inclining to fears and complexes; 3. parathymics — irritable, suspicious, fanatical, masterful; 4. hebethymics — playing the fool, intellectual, stubborn.

A third type, introduced by Kretschmer himself, is the *viscous-epileptoidal type* — not nervous, psychically sluggish, often bursting out with anger or hatred.

Conducting very extensive researches in hysteria, in the course of which I examined 2173 persons (hysterical types and their families), I separated 543 persons, who underwent an anthropometric, vegetative and characterologic examination. These persons possessed traits which could not be ascribed to the schizothymical, cyclothymical or viscous character. Later on I found these traits with several hundreds of sane persons, and I came to the conclusion that they occur so often in Poland, that we can separate them into a new characterological type. Many representatives of that type are to be found among Italians and Frenchmen, but very few in Germany, this is probably the reason why Kretschmer did not describe that type. This type has been called *skirtothymical* by me (from *skirtao* — to jump, to dance, and *thymos* — the temperament), and it shows 3 fundamental traits: a quick emotional inflammability, an imaginative attitude towards life endowed with „*le geste d'un grand seigneur*“, and a psychic resistance in bad times coupled with light-heartedness in times of success. A pathological heightening of that type with a hysterical character, is called by me a *skirtotoid*, with whom „*le geste d'un grand seigneur*“ is rather theatrical. In my researches. I have ascertained that 49% of skirtothymics have shown distinct somatic displastic traits. A skirtothymic has a changeable psychic tempo and a fluctuating disposition, and the characteristic style of his life consists in using „*le geste d'un grand seigneur*“. His movements are lively, sometimes nervous, of a jumping-dancing kind. He is vain and light-hearted, generally unpractical, often soaring up in the clouds, he is an individualist who cannot bear any restraint. His imagination is rich, he grasps things quickly, is full of good intentions and good ideas, but lacks perseverance, He is not conscientious, neither is he ruthless, he has a great deal of tolerance, magnanimity and bravery. He does sympathize with other people. He becomes quite incalculable, when in love.

Pure skirtothymical types may intensify the creative values of artists, musicians and writers. They are rather dangerous in the case of politicians, because they may lead to short-lived successes and risky, though striking moves. In the case of scientists, skirtothymics are not very productive, but they display both wisdom and practical intelligence. Humanists are predominating among them, abstract sciences being less accessible to them. Skirtothymical scientists with an admixture of the schizothymical type have the best qualities perhaps. They are versatile, but thorough, both analysts and synthetists, keen, but full of soaring thoughts.

CLINIC OF NEUROLOGY AND PSYCHIATRY, JAGELLONIAN UNIVERSITY, CRACOW

A NEW PARTITION, Facts and Views, is presented by this issue, following the separately summarized articles. Its chapters are: *On the lack of jurists in the reconstruction of... public law* (some important political reforms in Poland seem to be introduced without being discussed beforehand by specialists and theoreticians); *More about atomic energy* (being a discussion of several articles in *The Economist*, *Discovery*, and other publications); *The scientific degrees and functions in U.S.S.R.* (commenting the differences between the

nomenclature used in Poland and U.S.S.R.); A wireless university arises (a conference was held by the wireless directors in Kraków, representatives of science and public authorities being present; the Polish Broadcast will diffuse knowledge by cycles of lectures and make known the importance and needs of science and scientific methods and views).

After this a chronicle of scientific life in Poland: the activities of the Polish Society of Economists, state Hygienic Institute; accounts of the congresses of Polish prehistorians and of the Polish Zoological Society; the description of an exhibition of newer topographic maps from the world over. A review of the Press follows. Then come reviews of English publications (*The Scientific Civil Service, Philosophy, Mind, British Medical Bulletin, Biology and Human Affairs*) and a chronicle of science abroad.

Beginning with the next number of the *Life of Science*, we shall include a short review of scientific life in Poland in the English language, besides the usual summaries of articles.

The Editor of the *Life of Science* wishes to offer his best thanks to all the English institutions and publications for having consented to exchange their periodicals for ours, as they are of the greatest value to us, and this is at present the only way to get them.

The annual foreign subscription rate is 4.00 Dollars.

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