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CZECHOSLOVAK SCIENTIFIC CONFERENCES: BIOCHEMISTRY,  
CHEMISTRY, AND NUCLEAR PHYSICS

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CHEMISTRY, AND NUCLEAR PHYSICS

[Following are translations of articles on the above subject, selected from a Czech source. Source information accompanies each article.]

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FIRST NATION-WIDE LOW TEMPERATURE CONFERENCE IN PRAGUE

-Czechoslovakia-

(Following is the translation of an article by Jiri Ruzicka and Stanislav Safrata in Vestnik Ceskoslovenske Akademie Ved, Vol 69, No 5, Prague, 1960, pages 511-515.)

On 19-21 August 1960, the first nationwide conference on low temperatures was held in Prague in the building of the CSAV (Ceskoslovenska Akademie Ved--Czechoslovak Academy of Sciences). It was organized by the Institute for Nuclear Research of the CSAV, in cooperation with the commission for nuclear technology of the Czechoslovak Society for Applied Sciences. Present at the conference were 80 participants from laboratories of the CSAV, from national research institutes, universities and industrial plants. In the general sessions of 20 papers were read on the subjects of:

- 1) The use of low temperatures in basic physical research;
- 2) The use of low temperatures in technology and industry; and
- 3) Description of helium and hydrogen liquifiers and low temperature laboratory techniques in Czechoslovakia.

In his introductory speech, Vl. Svab, Director of the Institute for Nuclear Research of the CSAV, referred to the importance of low temperatures in contemporary physics and technology. Widespread use has been made in industry of liquid hydrogen and nitrogen, produced by liquifaction and rectification of air. Oxygen serves primarily in steel mills, where it makes possible the most efficient and most modern technological progress. It also serves in the chemical industry, in welding technology, and medicine. The expansion of nitrogen manufacture for the intensive production of ammonia and artificial fertilizers today has in this country a special importance in the solution of agricultural production problems. Low temperatures furthermore serve in the chemical industry in the step-wise condensation and separation of gaseous mixtures, in the manufacture of rare gases such as argon, neon and krypton for lighting

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equipment, in vacuum equipment, in increasing pumping speeds and the improvement of the final vacuum in diffusion and absorption processes, and in special working methods for materials such as rubber, steel, and the products of the food and pharmaceutical industries.

Transporting gases in their liquid state, especially over great distances, is incomparably cheaper than transporting them in gaseous state. Liquid hydrogen serves to a large degree in the production of heavy water, as an important nuclear material and furthermore as a propellant for certain types of missiles. Liquid hydrogen and certain hydrocarbons (propane, butane) are used in bubble chambers for the detection and study of high energy particles which have been produced in the very largest accelerators. Low temperatures furthermore have a substantial effect on elements of various electric currents, in that they considerably reduce the electric resistance of conductors, act as hum suppressors, and increase the quality. When copper coils are cooled with liquid gases, it is possible to achieve strong magnetic fields with the smallest sizes. Certain metals and alloys become superconductors at low temperatures and make possible the construction of very sensitive galvanometers, bolometers and memory elements of cybernetic apparatus, i.e., kryotrons. The super liquidity of helium is a subject of intensive research and still awaits practical utilization. The newest application of helium temperatures is connected with the creation of the so-called masers, i.e., micro-wave and ultra-micro-wave amplifiers employing quantum transitions of electronic orbits in para-magnetic crystals.

Several reports shed light on the task of low temperatures in basic physical research. The reports presented information on the contemporary state of the art in the world and on preparatory work in Czechoslovakia. In physics, low temperatures denote the temperatures of liquid hydrogen and helium down to temperatures around  $1^{\circ}$  K. Very low temperatures denote those below  $1^{\circ}$  K.

In a report on low temperatures and nuclear physics, St. Safrata of the Institute of Nuclear Science of the Czechoslovak Academy of Sciences presented numerous examples of the utilization of low temperatures in nuclear physics. Liquid hydrogen or helium is used in freezing machines of accelerators; for cathode cooling in discharge tubes; in the study of extremely fine structures of optical spectrums for the cooling of irradiated samples used in the preservation of artificially created disorders; it is used for the obtaining of intensive bundles of cold neutrons; and for the cooling of samples in nuclear and electronic resonance. Hydrogen bubble chambers are used in synchro-

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phasotrons for the study of primary particles. Nuclear reaction targets are often created by means of liquified isotopes of helium and hydrogen. A temperature of one millionth of one degree has already been attained in nuclear demagnetization. Intensive study of the mossbauer effect is spreading throughout the world. This effect made it possible to solve the basic problems of nuclear fluorescence by means of low temperatures. An important application of low temperatures is the study of oriented nuclei. This study has already brought ;important results and is continuing further on a large scale. The Institute for Nuclear Sciences is preparing work in this field. Among large installations, a helium and hydrogen liquifier was placed in operation for this purpose, as well as an 80-KW magnet for adiabatic demagnetization.

In the general discussion, Zd. Kovar of the Institute for Nuclear Science, Czechoslovak Academy of Sciences, described the construction of a calorimeter using liquid nitrogen which serves for measuring radio-active doses and for measuring the intensity of bundles of particles from accelerators.

J. Paces of the Physical Institute, Czechoslovak Academy of Sciences, reported on the study of magnetism at low temperatures. The magnetic properties of para-magnetic salts are widely used for the creation of very low temperatures by means of adiabatic demagnetization. At these low temperatures, the study of magnetic properties of salts offers valuable information about the type and magnitude of magnetic interactions. For the theory of magnetism, the study of anti-ferro-magnetic materials at low temperatures is very significant. Magnetic research at the Physics Institute of the Czechoslovak Academy of Sciences concentrates on this subject.

L. Stourac of the Institute of Applied Physics, Czechoslovak Academy of Sciences, reported on the application of low temperatures in the study of physical properties of semi-conductors. A number of properties of semi-conductors can be thoroughly studied by determining their temperature relations down to the regions of low temperatures. Among these, for example, belong the Hall effect, thermoelectricity, thermoelectric force, and the so-called cyclotron resonance. The Institute for Applied Physics has, until now, achieved notable results by studying semi-conductors at temperatures equal to or higher than that of liquid nitrogen. The expansion of work at liquid helium temperatures is currently under preparation.

The report of M. Odehnal of the Institute of Nuclear Sciences, Czechoslovak Academy of Sciences, was devoted to paramagnetic resonance at low temperatures. In the study

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of resonances, the importance of low temperatures resides in that the signal increases and the line narrows which makes it possible to analyze the spectrum to a higher degree of accuracy. Only the utilization of low temperatures made it possible to observe the hyper-fine structure of resonant spectrums, to measure the magnetic moments of nuclei, to attain the dynamic polarization of nuclei and to create quantum mechanical amplifiers of microwaves, the so-called masers. This type of amplifier has important practical application. The structures of ion crystals can be studied by means of electron paramagnetic resonance. Also studied can be impurities and other disturbances in semi-conductors, free radicals, etc. The Institute for Nuclear Sciences, Czechoslovak Academy of Sciences, has begun the study of the dynamic polarization of nuclei. By discovering two-quantum transfers, these studies have already achieved significant results at room temperatures.

The technique of temperature measurement is very important at low temperatures. A report on this was submitted by M. Kolac of the Institute for Nuclear Sciences, Czechoslovak Academy of Sciences. He described the functions of a constant volume gas thermometer; of resistance thermometers, particularly those of the carbon type; temperature measurement by means of super heated vapor pressures; and temperature measurement by magnetic methods below  $1^{\circ}$  K. For the standardization of helium temperature measurement, the recommendation was made to utilize the temperature scale approved at the Sixth International Low Temperature Conference at Leiden, in 1958.

A. Cizek of the Natural Science Department of the University of Brno reported on the resistance measurement of metals and alloys. The electric resistance of metals and alloys is very sensitive to the type and quantity of lattice disturbances. The activation energy may be determined by measuring the resistance in relation to temperature. For the purpose of accurate resistance measurement, the author worked out a method of electric measurement, which achieves an accuracy of 0.01%.

J. Ruzicka of the Institute for Nuclear Sciences, Czechoslovak Academy of Sciences, dealt with the utilization of low temperatures in the manufacture of heavy water. One of the most economical means of producing heavy water on an industrial scale, is the low temperature distillation of hydrogen for the production of deuterium which subsequently is oxidized to heavy water. It employs differences of  $1.5$  to  $2^{\circ}$  K which is the difference in boiling points of hydrogen isotopes at temperatures of approximately minus  $253^{\circ}$  C. Large-scale installations working at such low temperatures still offer certain problems which have yet to

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be solved.

J. Veleta of the Stalin Works gave a review of the modern large-scale manufacture of oxygen, especially emphasizing the low pressure method, which is the most economical for purposes of the chemical and steel industries. He conveyed experiences and certain parameters which were gained with the start up of a Linde TR 178 low-pressure apparatus, producing 4200 normal cubic meters per hour of 98% pure industrial oxygen, of 400 normal cubic meters per hour of 99.5% pure oxygen, and 7000 normal cubic meters per hour of nitrogen with a maximum oxygen content of 0.02%.

In his contributing paper, A. Urban of the Research Institute of the Kralovopolske Machine Works, Prague, gave data on a low pressure oxygen apparatus, type NKP-5 of latest Czechoslovak construction and manufacture. The apparatus is capable of producing 5000 to 5400 normal cubic meters per hour of industrial oxygen, 95 to 96% pure, or 4200 normal cubic meters per hour of 95% pure oxygen, 400 normal cubic meters per hour of 99.5% oxygen and 7000 normal cubic meters per hour of nitrogen with a maximum oxygen content of 0.01% or 4500 normal cubic meters per hour of oxygen of a minimum purity of 99.2%.

L. Vins of the "Victorious February Works" in Hradec Kralove, pointed to the influence on refrigeration cycles of gaseous mixtures separated into their components. Practical application shows that the thermodynamically most effective cycle for the liquifaction of a given gaseous mixture does not necessarily have to be the most economical cycle as far as the equipment, such as its rectifying components is concerned. Influence is exerted by individual parts such as compressors, expanders, heat exchangers, and distillation equipment, as well as by insulation losses and gas leakages. Examples were shown indicating the possibility of combining the cooling cycle with the technology of gas separation.

Vl. Smolik of the "Victorious February Works" in Hradec Kralove, referred in the conference to structures and construction materials used in his factory for the manufacture of low temperature gas separation equipment. He also mentioned improvements in the manufacture of heat exchangers and other equipment.

Inasmuch as equipment construction and the choice of materials for low temperature application are to a large degree dependent on the knowledge of their properties and behavior at low temperatures, the National Research Institute for Materials and Technology in Prague has initiated research into the appropriate testing methods and the actual determination of the low temperature properties of construction materials. A co-worker at this institute, O. Scholz, re-

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ported on types of tests which were undertaken, as well as on methods and results.

The conference directed a considerable portion of its attention to the description of low temperature laboratories in Czechoslovakia. J. Prusak of the Institute for Nuclear Studies, of the CSAV, reported on the first Czechoslovak helium liquifier at the Institute for Nuclear Studies at Rez near Prague. This liquifier follows Soviet design as well as the designs which the Institute for Nuclear Study (of the CSAV) made for a project at the Kralovopolska Works at Decin. The liquifier works by use of the Thomson-Joilet throttling effect, with nitrogen or hydrogen pre-cooling, and may also serve as a hydrogen liquifier. The output of the liquifier is 10-11 liters per hour of liquid helium or hydrogen and uses up 18 liters per hour of liquid nitrogen. The first liquid helium in Czechoslovakia was made in this apparatus 13 April 1960.

M. Krizek reported on the helium liquifier at the Institute for Applied Physics, CSAV, put into operation in August 1960. For the cooling of helium this liquifier partly employs gaseous expansion in a piston expander, and partly the throttling effect of a throttling valve, so that it does not need liquid hydrogen pre-cooling for the liquification of helium. The liquifier was furnished by the Linde Company of West Germany. Its capacity is 3.1 liters per hour of liquid helium. Liquid nitrogen consumption for its cooling is 25-30 liters per 8 hour operating period.

V. Sahanek of the Physics Institute, CSAV, then described the Soviet-designed hydrogen liquifier erected at the Physics Institute, CSAV, in Prague by the Kralovopolska Works of Decin. For cooling purposes the liquifier merely employs the throttling effect. Its capacity is 4 liters per hour of liquid hydrogen. When doubling the compressor output, the maximum liquifier output comes to 8 liters per hour of liquid hydrogen.

J. Nedved of the Institute for Nuclear Sciences, CSAV, reported on the possibilities of working with liquid hydrogen in laboratories which do not own a helium liquifier. He submitted for discussion the proposal to build in Czechoslovakia several stations equipped with efficient helium liquifiers and to deliver liquid helium to laboratories in Czechoslovakia in Dewar vessels. These laboratories would have to be equipped to compress the vaporized helium into pressure bottles which would then be returned to the central stations together with the Dewar vessels. Under today's conditions, the price of such equipment would not exceed Kcs 150,000. Maintenance and servicing of the equipment would be minimal.

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M. Litomisky of the Institute for Nuclear Science, CSAV, reported on laboratory low temperature technique. He dealt with temperature transfer through construction materials, low pressure gases and radiation. He gave the thermal conductivity of important construction materials, as well as radiation factors and data of importance for the calculation of the heat content of various materials. He gave examples of low temperature equipment, of various designs of Dewar vessels and, above all, of portions of the experimental equipment of laboratories.

K. Malek of the CKD Stalingrad (a machinery-manufacturing plant in Czechoslovakia) described an 80 KW laboratory magnet for obtaining low temperatures by means of adiabatic demagnetisation. The size of the air space is unchanged between 25 to 125 mm, the maximum diameter of the polar extension being 280 mm. When the space is 60 mm and the polar extensions have a diameter of 210 mm, a maximum capacity of 22.8 KG is attained. The magnet can be rotated through 180° and has a vertical lift of 550 mm. The coils are cooled by means of circulating oil.

For the most part, the reports were accompanied by lively discussions in which many valuable experiences were exchanged and many interesting problems were illuminated. On the last day of the conference, the participants were taken on a trip to the low temperature department of the Applied Physics Institute of the CSAV and to the Physics Institute of the CSAV in Prague.

At the conclusion of the First Nationwide Conference on Low Temperatures, the participants discussed and approved the following resolution:

The First Nationwide Conference on Low Temperatures brought together in Czechoslovakia for the first time the Country's experts working in the fields of physics and low temperatures. They dealt with a number of reports concerning the contemporary state and outlook, as well as results achieved so far in the field of low temperatures in our country. The conference contributed to the establishment of mutual contacts and to the mutual exchange of information which might lead to the solution of problems. The observation was made that rapid expansion in this field is taking place in all progressive countries inasmuch as the great importance of low temperatures has become appreciated in the steel and chemical industries, as well as in basic research and other fields.

For the fulfillment of the Third Five-Year Plan, it will be necessary to devote increased attention to the utilization of low and very low temperatures, both in industry and basic research. This is to be done in such a way that all possibilities are exploited which low temperatures offer

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for the improvement of manufacturing processes and the increase of manufacturing productivity. In the interest of economic and scientific expansion, the introduction and utilization of low temperatures must reach world standards as soon as possible.

The conference participants expressed their regret that the CKD Stalingrad plant had stopped the production of laboratory magnets. It is their opinion that it is uneconomical to lose the laboriously gained experience with their design and construction. The stoppage of their production necessitates the foreign purchase of similar equipment and deprives our economy of profitable export possibilities. Should it be impossible for the CKD to resume their production, the conference participants hold that the Ministry of Heavy Industry might find it suitable to assign their production to another plant.

The discussions of the conference further brought out that compressors delivered by our industry do not reach world quality standards. They are on the average considerably heavier and take up far more floor space than similar equipment manufactured in other countries. The conference participants draw attention to this deficiency and suggest that the development of new types with better parameters be taken up.

It furthermore came to light that our steel mills produce very few materials suitable for utilization at low temperatures. Inasmuch as rapid development in this field is expected in coming years, the conference participants suggest to the Ministry of Smelters and Ore Mines the expansion of research and production in this field.

For work with helium temperatures, the conference recommends the use of the temperature scale approved at the Sixth International Low Temperature Conference held at Leiden in 1958. It would be suitable to arrange another nationwide low temperature conference in two years.

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SECOND NATIONAL BIOCHEMICAL CONFERENCE IN  
PRAGUE

[Following is the translation of an article by V. Liebl, et al in Vestnik Ceskolovenske Akademie Ved (Journal of the Czechoslovak Academy of Sciences), Vol 69, No 5, Prague 1960, pages 525-536].

From 29 August to 3 September, the Czechoslovak Biochemical Society of the CSAV [Czechoslovak Academy of Sciences] held a biochemical conference in Prague in cooperation with the section for clinical chemistry of the J. E. Purkyne Medical Association of Czechoslovakia.

The conference took place at the Purkyne Institute in Prague (address: Albertov No 9) and in adjoining university buildings. It was attended by approximately 800 Biochemists, Physicians, Biologists, and agricultural workers. There were over 20 foreign participants.

In the morning of 29 August, the program was opened with introductory remarks by Professor Horejsi, scientific secretary of the Biochemical Society. The further sessions were divided into 13 sections plus a section in which the reports of the foreign participants were read. Altogether over 250 papers were read at the rate of 15 minutes per paper, plus 5 minutes for discussion. The authors accompanied the majority of their reports with slides, graphs, and charts, which contributed to better understanding of the subject matter. Every section was presided over by an expert in the particular field.

The conference ended at 4 PM Friday, 2 September with concluding remarks by Academician Sorma, chairman of the Biochemical Society. This was followed by a social evening in the Slovansky Dum and Saturday trips to scientific institutes and plants with biochemical problems in Prague and its surroundings. The conference was accompanied by an exhibition in the Purkyne Institute showing laboratory apparatus from various installations and plants in Czechoslovakia and elsewhere. This afforded our workers the opportunity to become acquainted with some innovations. Also shown was an instructive film on paper chromatography. (UOCHAB [possibly a chemical and biological Institute] of the CSAV). At the same time an exhibit and sale of specialized books was also arranged.

In his introductory speech, Prof Horejsi emphasized the social importance of biochemistry and clinical chemistry and pointed to

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our contributions of world wide importance (the Nobel Prize of Academician Heyrovsky for his work in polarography, and the Fritzsche Prize, awarded Academician Sorm for his research into natural matter, etc.) Biochemistry has become an extensive natural science which examines chemical processes in living organisms. A number of institutes and laboratories in our country are working on biochemical problems of prime importance.

Participating are the chemical, biological, virological, biophysical and other Institutes of the CSAV, as well as university departments of medicine and natural science, the Research Institute for Pharmacy and Biochemistry, and other places of work in Czechoslovakia. The outlook for biochemistry, one of the most momentous sciences, is very hopeful in our country. This was expressed in the Party congress platform, which mentioned science as having a basic importance in socialist society. The plenary session of the CSAV presidium also expressed its high evaluation of this science.

Particular attention was paid to 14 papers read by foreign participants specializing in various biochemical fields, who came to our conference from several countries, namely the USSR, East Germany, Poland, Hungary, and the USA. The first report was presented by Academician Braunstein and assistants (Moscow) dealing with the influence of optical isomers of the cycloserin antibiotic on the activity of certain enzymes, especially transaminase. Cycloserine has a predominantly inhibitive action on enzymes. The enzyme systems of transaminase may be divided into those highly sensitive and little sensitive to cycloserine. The conclusion listed the special mechanisms determining the particular inhibitive kinetics of cycloserine action on transaminase.

The large problem of the mutual relationships of sub-cellular fractions in the organization of cellular processes was dealt with by Professor Rapoport (Berlin). He followed the complicated processes of cellular breathing which are particularly associated with mitochondria and the cooperation of cellular organelles, as well as soluble phase enzymes tied to the organelles, particularly mentioned were the transfer of hydrogen, electrons or radicals between these particles.

The report of Golovacky and assistants (Lvov) dealt with the metabolism of animal glycolides, especially the relationships between glycolysis and the penta-cycle. These mostly are energy breathing processes using sugar nutrition for its organisms.

The next two reports dealt with molecular and biological studies of enzymes. Keleti et al (Budapest) gave certain data regarding the active center of the enzyme d-dlyceraldehyde-3-phosphate-dehydrogenase. He indicated the relationship between the sulfhydryl groups, the albumen structure of the enzyme, and the active centers to the catalytic places of the enzyme. The related report of Szabolcsi and assistants (Budapest) dealt with structural changes induced by blocking sulfhydryl groups in the enzyme of aldolase,

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accompanied by the latter's loss of enzyme activity.

The creation of unsaturated fatty acids from saturated ones, which occurs in the course of intestinal absorption in frogs, was dealt with by Dominas (Warsaw). This is one of the more notable mechanisms for generating unsaturated fatty acids.

Trehalose generated from glucose is the main sugar component in the hemolymph of many insects. This substance and the related enzymes of trehalase in the larvae of Galleria mellonella was dealt with by Mrs Niemerko et al. (Warsaw). The mentioned substances are important in the creation of chitine.

The interesting report of Samochvalov et al (Moscow) concentrated on polarographic analysis and particularly on the determination of oxygen during the course of fermentation processes in growing micro-organisms, nutritive yeast; and the production of antibiotics. By means of polarography it is possible continuously to register the oxygen content on platinum electrodes without substantial destructive influences of the other components in the culture medium.

Two reports by lecturers from Warsaw were dedicated to the biochemical problems of muscles. The first, actually the physiologically oriented report of Niemerka et al, dealt with the energy effects of rich organic phosphates (especially ATP) on muscle contraction and rehydration. The second, the biochemical report of Drabikovsky, dealt with the heretofore undescribed proteolytic activity of actine preparations and the more detailed characteristics of this phenomenon.

The interesting report of Frunder et al (Jena) in the field of toxicology dealt with biochemical changes in the livers of mice after damage by tetrachlormethane. This generated certain basic changes in various cellular structures and organs, especially the disruption of their function and the lowering of glucose utilization.

Two reports dealt with the biochemical problems of neoplasms. Baranowski et al (Vratislav) dealt in their work with the comparative metabolism of L-alpha-phosphoglycerol in normal tissues and in mammal neoplasms, as related to various glycolysis inhibitors.

In a highly important report, Fiala et al (New York) dealt with the proliferation of tumor cells and their relation to the metabolism of deoxynucleotides during the course of experimental carcinogenesis caused in the livers of rats by chemical aromatic compounds. He evaluated these inter-relations mathematically with regard to specific enzymes, such as liver d CMP-deaminase and others. They were also evaluated in regard to their occurrence and regular creation during the course of organic aging. He also followed and evaluated a series of other factors.

The voluminous and comprehensive report of Severiny et al (Moscow) touched on the peculiarities of phosphorylation processes when experimentally imparting myocarditis and hyperthyreosis to rabbits and, occasionally, to rats. The authors followed a series

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of biochemical characteristics and changes in cellular components, especially of mitochondria and the corresponding enzymes.

The above mentioned reports of the foreign participants were generally on a high level and evoked good response from the audience. This high standard was also apparent in a large number of reports by our own workers, as listed below.

The speeches of our participants were given in 13 separate sections.

Section 1 - Biochemical methods.

The first two addresses of this section dealt with the use of radio-isotopes (UOCHAB). Radioactive measurement of weak emitters ( $C^{14}$ ) was described, as well as the modification of a GM counter. On its basis was then worked out a method for determining the radioactivity of the carboxyl groups of free amino acids. Also described was a method of determining amino acids by means of titration with copper sulfate. Prerequisite for this work is the determination of all material quantities in an isolated medium. In contrast to this, the determination of histamine, as described in another talk consists of work with microquantities of biological material. For structural work in the field of peptides and albumens, a method was worked out for determining amino acids which have amides at their C-end. As far as electroforetic methods are concerned, these were mentioned mainly in connection with the determination of the homogeneity of albumens and their preparatory fractionation.

A contribution for our laboratories was the informative talk about the new biochemical isolation technique of Sephadex and its use (UOCHAB).

The recent new development of the chemistry of lipides and their analysis became apparent in several reports. [Higher institute for Physical Biology?] (VUFB). Paper chromatography of fatty acids, and phospholipides and the esters of cholesterol was described. These theses were linked with other reports on the paper chromatography of steroids. Polarography was used for the analysis of steroid hormones. Among the further polarographic works, the polarographic determination of active pepsin was interesting. Somewhat isolated remained two talks about carotenoids. Of these a method for chromatographic division on silone deserves attention. [Silone is the Czech version of Nylon.]

This time there were few articles on equipment construction. Interest was aroused by the description of a perfusion pump and a microbe press, both of which could be inspected in the adjoining exhibit of laboratory apparatus.

Section 2 - Albumens, Peptides, Amino acids, Nuclear Acids.

The many-sided problems of albumens were, on the one hand,

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treated from the viewpoint of macro-structure and the physical and chemical behaviour of albumens and, on the other hand, from the viewpoint of micro-structure and proteo-synthesis. In the field of physical chemistry, most interesting were the papers on the polarographic behavior of albumens in which the authors by means of physical chemistry isolated and characterized a group of alpha-glycoproteins and attempted a description of various albumens with regard to their polarographic activity in a Brdic solution, (Department of physical chemistry at Karlova University).

Photo-oxidation and changes of several physical-chemical properties of blood plasma were the object of a study by workers of the Institute for Haematology and Blood Transfusion in Prague. The increase of average molecular weight was observed as well as the formation of aggregates. In the field of the micro structure of albumens, a series of papers was presented regarding the partial structures of chymotrypsine, trypsin and their enzymogenes. The use of modern separating columns and enzyme fission made possible the determination of larger peptide fragments from both albumens (UOCHAB). In the comparative study of the haemoglobins of various animal types, a similar method made possible the determination of an analogy in the alpha chains of hemoglobins and differences in chain endings between beta and delta. The results were complemented by a study of proteosynthesis which was made with the help of C<sub>14</sub> (Dept. of Medical Biochemistry at the Medical School in Kosice). With the help of <sup>131</sup>I, the problem of the interaction of histone with the albumens of blood plasma was solved. By generally standard methods, descriptions were given of the isolation of glaucopor-phyrine, pathogenic beta-lipoprotein and melanoprotein.

Workers from the Biochemical Institute at the University of Brno pointed to the non-enzyme origin of the alpha-ket- analogs of certain basic amino acids in the presence of copper salts. In the field of nuclear acids, several papers touched primarily on the basic methodical approach to the solution of the function and the structure of nuclear acids. Of note among these is microspectrophotometry of nuclear acids in the visible part of the spectrum of one cell and the analytical evaluation of the newly worked out method of alcoholic fractionation of nuclear acids. The results of the study of the enzyme action of desoxyribonuclease I and II clarify the method of mono-nucleotide formation during the splitting of DNK of various origins (UOCHAB). Another method of determining desoxyribonucleotides by use of microbial techniques was chosen by the workers of the Biophysical Institute of the Czechoslovak Academy of Sciences and the Biological Institute of the University of Brno.

A noteworthy paper on the properties of subunits of pathogenic viruses of haemagglutinines and ribonucleoproteins gave a picture of the probable macro-structure of these viruses. (Virological Institute of the Czechoslovak Academy of Sciences in Bratislava).

Section 3 - Enzymology

Ten papers were read in this section, touching on various problems of enzyme reactions. The introductory paper (Kellen et al.) was a contribution to the exploration of the transaminase activity of glutame-tiro-sugar acid, in its relation to the incubating time of the liquor, bile, normal serum, and the serum of hepatitis patients. The authors presumed the existence of an activating agent in the latter.

The next report (M. Sevela et al) dealt with the newly worked out photo-colorimetric method and optimum conditions for determining the activity of sorbit-dehydrogenase in relation to liberated fructose in blood serum. It also dealt with the characteristics of sorbit-dehydrogenase of the liver. The method has an application in the clinical diagnosis of liver diseases, especially infectious hepatitis.

The report of Mircevova et al dealt with the activating effect of a weak dose and the inhibiting effect of a stronger dose of ATP (Adenosine-triphosphorous acid) on the activity of aldolase, when glucose is transformed into triose in hemolyzed and undisturbed erythrocytes. Obviously, ATP is here one of the regulators of glycolytic activity.

The report of L. Lacek, Burger et al was devoted to the exchange transfer of sugars in human erythrocytes. It was ascertained that the entry of galactose into blood corpuscles depends on the glucose content of these blood corpuscles. If no sugar is present in blood corpuscles, the latter take up other sugar at a slowerrate from the immediate environment.

Kovac dealt with present-day comparative biochemistry, especially as concerns succino-dehydrogenase. He found this enzyme to have at least two forms, one in aerobic and the other in anaerobic organisms. In the yeast fungus *saccharomyces cerevisiae*, both forms of the enzyme are represented. Their mutual relation also depends on the conditions of cultivation.

Two reports by Rokos et al. were devoted to the lowering of pancreatic lipase activity on albumen fission of tributyrine. This is done with serum as well as with pure serum-albumens and globulins. Proteolytically fissioned albumens do not inhibit. This causes only undisturbed albumens.

The proteolytic activity of actinic preparations during storage was the subject of a further report (Drabikowski); to date it has not been observed. The loss of actine effectiveness is also conditioned by this autolysis.

Berankova, Cihar et al. dealt with the specifics of oxytocinase preparations from pregnancy serums. Two separate forms of this serum were found in globulin and albumen fractions in which also the inhibiting effects of certain oxytocine fragments were observed. Aside from their theoretical importance, the results may also have importance in the field of obstetrics.

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The final report (Placer et al) was devoted to the serum inhibition of the lipo-oxidation of unsaturated fatty acids. Lipo-oxidation occurs mainly in livers, but also in erythrocytes, plants and elsewhere. Lipo-oxidation inhibitors are found mainly in human serum. These inhibitors were described in further detail.

### Section 4 - Structural Biochemistry

This section dealt with the ever expanding young science of the biochemistry of cell structures. This science, like many other branches of biochemistry, leads us to a closer knowledge of life functions and the co-ordination of biological events. Seven reports dealt with this subject. It is encouraging to note that this special and challenging field is expanding in our country.

The two introductory reports (Cerkasov, of the Natural Science Department, Karlova University) dealt with the isolation of sub-cellular fractions from the muscle tissues of insects by means of differential centrifugation (Mitochondria, Myofibrilla, microsomata, and nuclei). He demonstrated their metabolical characteristics in relation to the physiological functions of the various muscles under comparison. In the case of cellular nuclei which had been isolated from the homogenates of muscles suffering from hypertonic sacharosis, he determined the contents of nuclear acids and albumens and made a comparison of various types of muscle tissue.

In a further report (Drahota, Physical Institute, CSAV) the author dealt with the respiration of mitochondria isolated from normal and de-nerved rat muscles. The respiratory activity was lower in the case of mitochondria from de-nerved muscles. The relation between this activity and osmotic resistance of mitochondria was discussed.

The report of Fencl et al (Biological Institute, CSAV) spoke of the methods by which certain anions enter into blood corpuscles. It mainly dealt with the anions of halogenides and inorganic phosphates. As to the entry of larger diameter anions (phosphate, sulphate, jantaran), acetic acid brings about a strong inhibition. These problems were discussed from the wider viewpoint of the influence on transportation systems as well as from the viewpoint of permeability.

The following group of reports concentrated on problems of albumen sythesis and the control of important enzyme changes which are connected with the metabolism of albumens.

A report (Liebl, Biological Institute, CSAV) also referred to the course of enzyme reactions in experimental colloidal compounds. The enzymatic fissioning of albumens and nucleic acids is strongly inhibited in albumen-nuclear acid complexes. Under favorable conditions, these tissues protect each other whenever they are in symplex compounds. The facts thus determined were discussed in their relation to the mechanism of albumen and nuclear acid synthesis as

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well as to certain cellular organelles and their construction, especially microsomes and the cell nucleus.

An interesting report by Kalouska et al (UOCHAB) was devoted to the influence of nucleotide analogs in their relation to albumen synthesis of cell systems as carried out under glass. They examined the part played by soluble RNK in the albumen synthesis of liver microsomes based on the incorporation of radioactive leucine. For nucleotide analogs the authors used 6-azauracil and its derivatives which, for the most part, had a greater inhibiting effect on leucine incorporation into soluble nuclear acids than into microsomes.

The last report, delivered by Chaloupka, Veres, et al (Biological Institute, CSAV) dealt with new information on peptide synthesis and albumen synthesis with the *Bacillus megatherium*, carried out in an isolated cyto-plasmatic membrane, as well as in RNK and with cyto-plasmatic albumens. This is done by incorporating radioactive asparagus acid under the inhibiting effect of chloramphenicol. The latter obviously blocks the synthesis of cyto-plasmatic albumens until after the transfer stage of activated amino acids to RNK. Also discussed were further complicated problems dealing with the incorporation of amino acids, as well as with albumen synthesis in cyto-plasmatic membranes.

This group of reports demonstrated the great interest devoted in this country to cellular compositions, their metabolic relationships and problems dealing with their proteosynthesis -- a field basic in its importance to the recognition of biological processes and living organisms as a whole.

Section 5 - Biochemistry of Micro-organisms and Anti-biotics.

Roughly 30 reports were devoted to the biochemistry of micro-organisms. Among them were works on methodology, such as the utilization of oscillographic poarography for the determination of various substances in bacterial cells (Kalab). There were also works reporting on new and concrete results in biochemistry. A number of papers dealt with the metabolism of moulds (Munk et al, Buresova and Kotek, Vinterova et al, Sihyta, Herold et al), which are closely related to antibiotics as far as their production and the mechanism of their effectiveness is concerned (Hess et al, Turkova et al, Musilek and Sevcik, Krcmery et al, Vavrinkova et al). Janicek and Kalousova studied the antibiotic effect of chlorotetracycline on the preservation of meats.

Considerable attention was devoted to the metabolical processes of various pathogenous micro-organisms (Stricker et al, Niznansky, Kockova-Kratochvilova, Drobnicova). Studying the living phenomena of various infectious bacteria makes it possible to plan and prepare effective protection against them. In their work, Kohoutova and Hubacek use modern transformation and transduction methods with micro-organisms.

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While in the past biochemistry made detailed investigations into the method of cellular nutrient decomposition, it is only lately that it has begun to penetrate the far more difficult field of the biological synthesis of the building blocks of living matter. In this connection it is very significant to observe the direction which studies have taken in regard to proteosynthesis and bacterial growth. For this purpose a very convenient micro-organism is the intestinal bacteria *Escherichia coli*, to which Kovac et al, Chaloupka and Janacek directed their attention, Jirsak and Dadak used other microbe samples. The biosynthesis of antibiotics stands in the forefront of the interest even of organic chemists (Major et al).

Various types of yeast fungi serve as model systems for the study of processes which are generally applicable to the majority of living matter. Thus one of the natural regulatory mechanisms of regressive structure, the so-called Pasteur effect, was finally more closely defined in its effective mechanism by Kotyk. The metabolism of sugars in yeast fungi was the object of a paper by Kralova and Kockova-Kratochvilova, as well as Hrstka, Ginterova and Mitterhauszerova.

Section 6 - Plant Biochemistry.

Plant biochemistry was represented by ten reports. The introductory speech touched on the possibility of utilizing *Vlastovic-nick vetsi* [translator's note: this is a plant, not found in the dictionary] as a source of vitamin A. It was ascertained that its stocks and leaves contain a large quantity of carotenoids and that the practical exploitation of this finding is a possibility for animal raising (Blattna, Blattny, Sr., and Pozdena). Workers from the Phyto-Pathological department of the Biological Institute of the CSAV further acquainted the listeners with their biochemical work in plant virology. A report was entitled: "Type and Size of Particles Accompanying the Virus Diseases of Spruce of Fir Trees (*Picea Excelsya*)". The report also included a description of a new method for the delipidation of preparations (Cech, and Kralik). A further title: "Isolation and Characterisation of the Virus Causing Infectious Sterility in Hops," (Cech and Pozdna).

The Biochemical Institute of the Department of Natural Science at the Karlova University presented two voluminous studies: A) The Influence of l-thio-D-glucose on the Metabolism of Sugars and Amino Acids in Germinating Pea Plants (Jiracek et al.), and B) On Influencing, by Means of Manganese, the Germination and Nitrogen Metabolism of the Same Experimental Materials (Kostir et al.)

Research into the physiology and biochemistry of ascorbigen, well-known from the last biochemical convention, was this time represented by studies dealing with the biogenesis of ascorbigen by means of 3-indolylacetonitrile and indolyl-3-carbonic acid from d, l-tryptofane-3-<sup>14</sup>C in cabbage (Kutacek, Prochazka, Grunberger).

The reaction sequence in the biosynthesis of ascorbigen from this material was suggested on the basis of the chromatographic tracing of the semi-products from the metabolism of tryptophane -  $^{14}\text{C}$ .

Three reports came from the department for plant physiology and physiological genetics of the Biological Institute, CSAV. Chvojka and Veres dealt with the effect of purine derivatives on the growth of apple tree buds and on the incorporation of radioactive phosphates. It was ascertained that the growth of buds is stimulated by certain purines, which also leads to the increased incorporation of  $^{32}\text{P}$ . Lustinec and Pokorna followed the blocking of glycolytic and pento-phosphatic breathing of developing wheat leaves by means of a challenging method, namely the specific inhibition of breathing, the chromatographic tracing of intermediate products, and the determination of  $^{14}\text{CO}_2$  from glucose, marked on the first and sixth carbon. They determined that during the aging of the leaves the pentose cycle asserts itself increasingly to the detriment of glycolysis. Certain growth stimulators and inhibitors may cause the same qualitative shift in the blocking of the breathing passages. Tupy, and Hrabetova delivered a report entitled "Contribution to the Study of glycide Nutrition of Pollen Brines [pylove lacky, Lacka = brine?]. It is part of the physiological study on the incompatible inhibition of brine growth which was solved at the above mentioned laboratory. It was ascertained that pollen brines of apple trees and other plants breathe saccharose much more intensively than glucose or fructose. The paper further explored the reasons for these phenomena.

Further presented was a report on the interdependence of sulphur content and strumigenosis of cabbages (Sedlak). This paper showed that increased sulphur content in cabbages increases their strumigenous effect on animals.

#### Section 7 - Animal biology.

Twenty-two reports were read in this section. They were contributed by Czechoslovak places of biological work of the greatest variety, as far as their aims were concerned. For this reason the problems treated in this section were not homogeneous and covered a wide spectrum. The report of F. Chytil from the Laboratory for Physiology and Patho-physiology of the Transformation of Matter, a part of the CSAV [Czechoslovak Academy of Sciences] touched on the inductive enzymes of threonin dehydrase and tryptofana pyrrolase in the liver of rats. The Department for Experimental Biology and Genetics of the Biological Institute, CSAV, made three reports. I. Hilgert and Z. Pokorna noted the increase in the titer of serum antibodies after immunization with a protein contained in an insoluble DNK complex against immunization with a pure protein. J. Svoboda, summarized the results obtained to date with transformation experiments obtained in higher animals with the

help of a transplantation test, Miss V. Haskova et al. noted the presence of antigens responsible for the incompatibility of tissues in cell-less extracts from tumors and in an ascitic liquid deprived of cells. The Virological Institute in Bratislava presented two reports covering the study of inhibitors and specific antibodies against the virus A<sub>2</sub> - influenza, carried out by means of taper electroforesis (Hana, Styk et al.) J. Sterzl and co-workers of the Immunological Department, Biological Institute, CSAV, presented two papers. In the first, they concentrated on the finding of effective metabolical inhibitors which it would be possible to employ in certain diseases and which would help clarify certain problems regarding the mechanism of the origin of antibodies. They found the most effective ones to be sulphur-substituted purine inhibitors. In the second paper, they found regularities in the origin of gamma-globulin. They found gamma-globulin to occur in suckling pigs immediately after birth at a time when antibodies are not yet created. They are differentiated from the gamma-globulin of mature pigs.

A number of reports was devoted to partial metabolical aspects of the central nervous system. Changes occurring in the transformation of basic metabolites during the widening depression of the grey cortex [seda kura] were followed in detail. (J. Krivanek, J. Bures). Results indicate that the widening depression is propagated by shifts of potassium ions and thus come close to the explanation of the mechanism of this phenomenon. A further study was made of the effect of potassium and calcium on the course of individual processes in the cortex. The effect was ascertained of the ion composition of an extraneous medium on the surface of physiologically active gamma-aminobutyric acid and glutamine in the sections of the grey cortex (R. Rybova), and on the incorporation of <sup>35</sup>S-methionine into an albumen fraction carried out in a glass vessel (J. Folbergrova). Results showed that the potassium ion concentration in the medium influences the metabolism of important free amino acids as well as the incorporation into proteins. T. Tursky attempted to find an explanation for the occurrence of acetyl asparagus acid in the central nervous system. He did this by following corresponding changes of its surface in several physiological stages. The reason for the comparatively high acid concentration in the brain remains unexplained. M. Cernoch found that the surface of the glutat-ion in the brain is independent of its surface in livers.

Two reports were devoted to the mechanism of cation and water transportation in sections of kidney skin and to the influence of potassium and calcium on these processes (A. Kleinzeller and A. Kotyk). It was proved that water is transported as a solution of the most important cations. On the basis of findings concerning the potassium phosphate permeability of kidney cell membranes, an explanation was suggested for the different influences of potassium and calcium on the metabolism of kidney skin sections and brain skin section.

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Several reports in this section were given by workers of our veterinary and breeding places (S. Bartos et al. M. Bartik, J. Jicha et al., L. Ottova, M. Gazo). They dealt with several aspects of the metabolism of agricultural animals under normal conditions. P. Mach studied the dynamics of blood plasma albumens of completely irradiated chickens. R. Zak, et al, of the Physiological Institute, CSAV, busied himself with the relationship of the metabolical activity of albumens to the function of muscle. K. Slama dealt with changes in the activity of dehydrogenases and cytochromoxydase during the course of metamorphosis in [pilatky?]. Slama is from the Biological Institute, CSAV.

Section 8 - Biochemistry of Neoplasms.

Ten reports were read in the section on neoplasms. In view of the popularity of the subject, these were widely discussed. The majority dealt with the way a healthy organism distributes various substances and an organism inflicted with a tumorous disease distributes them. Papers were also read touching on the subject of the actual effective mechanism of tumorous agents and on the explanation of the metabolical cause of the differences which were found.

By means of chromatographic techniques, Z. Brada undertook the fractionation of muco proteins and polysaccharides from urine.

The author identified the separated fractions and found differences between cancerous and healthy patients. Cancerous lipophilous chromogens were isolated by means of chromatography on aluminum oxyde (K. Cerny et al.) F. Musil described and analyzed a simplified process for the determination of malignolipide in blood. J. Svejcar et al determined that an increasing value of the Brdicka filtrate reaction is accompanied by decreasing values of the Weltmann flaking reaction. Two reports were devoted to melanogens isolated from the urine of patients with malignant tumors. Z. Pechan worked out a method for the isolation of A melanogen with the help of column chromatography and determined its chemical and physical-chemical properties. J. Duchon isolated non-nitrogenous melanogens and attempted to determine its chemical properties. Z. Pechan and Z. Brada turned their attention to processes which act on the increased hexosamine content in tumorous tissues. These papers were notable in that their authors used working analyses and a wide selection of materials. The contribution of the authors resided in the fact that they analyzed a series of diagnostic tests and, especially, that they accumulated exact data on tissues forming in organisms afflicted by tumorous diseases. Few reports, however, gave convincing data concerning the mechanisms which cause such differences between normal and tumorous organs. A paper from the Endocrinological Research Institute in Prague (K. Silink and K. Cerny) dealt with the evaluation of the enzyme activity of phosphomonoesterase in connection with its dependence on hormone therapy.

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They isolated and fractionated acid phosphomonoesterases and identified some types of these enzymes which are specific for tumorous tissues. J. Riman and Bo Thorell studied the properties of virus ATP-ase with the help of a very servicable model of the bird virus erythromyeloblastosis. The virus of myeloblastic bird leukemia, as determined by Beer and his school, is constantly accompanied by the ATP-ase enzyme, of the function of which, as far as the induction of leukemia is concerned, nothing had to date been known. The authors determined that ATP-ase associated with the myeloblastic virus of bird leukemia has properties in common with ATP-ase fixed on cell membranes. However, a number of its properties is different from mitochondrial ATP-ase. For this enzyme, they determined a number of specific properties which signify the first contribution to the explanation of its function. The authors explain this in the following fashion: ATP-ase accompanying the virus particle in the attacked part of the cell lowers the level of ATP, which, for one, leads to the decomposition of mitochondria because the dynamic balance of ATP in the cell medium and the wall of mitochondria is one of the conditions of the functioning of the structural behavior of this particle. With the decomposition of mitochondria and the change in the ratios of ATP and ADP occur changes in the ratios of extra-mitochondrial glycolysis and intra-mitochondrial breathing. On the basis of the theory of V. R. Potter, the ADP surface increase, just as in other diphosphates, probably favorably influences the NK biosynthesis in the target cell. This work very probably has great significance for understanding the carcinogenic actions of tumor viruses.

Section 9 - Intermediary Metabolism.

Workers of the Institute for Hematology and Blood Transfusion and of the Laboratory for the Metabolism of Albumens reported on the inhibiting and toxic effect (in vivo) of 4-amino-analog derivatives of chlorophylic [listova] acid. They determined that the mechanism of the action of 4-aminoanalogs rests primarily on the inhibition of the hydrogenases of chlorophylic acid and the dehydrogenases of hydroximethyl tetra-hydrochlorophylic acid. Of the analogs tried on mice, the least toxic was N-10-hydroxymethyl-aminopterin. (Slavikova et al., Motycka et al.)

In his talk regarding the peculiar position of desoxycytidin in the metabolism of rats, the author (Parizek) voiced the opinion that the relatively high level of this substance in the organism is given by the fact that the N-glycosidic structures of desoxycytidin is not split within the organism, in contrast to other desoxynucleosides.

Three reports dealing with the intermediary transformation of glucose mentioned the accelerated decrease of glucose in blood, in vitro, after addition of thyroxine cortisone, (on the contrary caused a lowered utilization). Further mentioned was the accumu-

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lation of lactic acid in anoxic brain tissue, and finally mentioned was the mutual comparison of lactate and glycerophosphate in various types of insect muscles. The author (Kubista) assumes that in this case the intensity of oxidating phosphorylation decreases with decreasing metabolism.

Two reports dealt with the problem of cholesterol in metabolism. The first of these, presented by workers from the Endocrinological Research Institute, followed the application of considerable cholesterol quantities in rabbits, and used a complicated exponential curve to infer its slower removal from blood after the application of cortisone. The second talk referred to changes of cholesterol fractions in test animals after the application of various diets.

A further report spoke of the incorporation of radiophosphates into fibroblasts infected by the virus of Newcastle disease. During the course of the first three hours of incubation, heightened activity in the infected cultures was observed in the NK fraction. Phospholipide fractions showed heightened incorporation only after the conclusion of the latent phase.

Hela cells infected with poliomyelitis virus did not show changes in the consumption of acid, glucose, or in glycolytic activity during the first phase of virus synthesis. Five hours after infection, a decline in metabolism showed up together with a beginning of the cytopathogenous effect.

Another report spoke of the biogenesis of iodine compounds and hormones in the thyroid gland of rats.  $I^{131}$  was used for the experiments; it was found that an iodine deficit is accompanied by a decreased synthesis of 3:5-di-iodo-tyrosine.

The last talk reported on the possibilities of applying to biochemistry and biology the principles of cybernetics.

Section 9 - Intermediary Metabolism

[This title is very likely a misprint in source and should have read:

Section 10 - Clinical Biochemistry].

The section on clinical biochemistry had 40 reports on its program, of which the overwhelming majority dealt: 1) with the methodical evaluation of a number of different enzymatic systems in body liquids, especially in blood serum and stomach juice; and 2) with the significance of their observation in various pathological conditions. The greatest attention was paid to the dehydrogenases of lactic and maleic acid, the transaminases of glutam-pyro grape [hroznová] acid, alalytic and acid phosphatases, uropepsin and ~~pepsinogen~~. An interesting contribution was the electroforetic study of cataracts occurring in the Takat reaction and the attempt

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to clarify, with the help of immunal-electroforeses, the reactive mechanism of certain further non-specific flaking and cataract reactions. Several authors followed in a number of patients the glyco-proteide content in blood serum and liquor. Several contributions were devoted to the analytical side of albumens, for example the reaction of blood serum albumen with picric acid, a shortened modification of the Weltmann reaction, the sedimentation mechanism of red blood corpuscles, the model ultrafiltration of serum, the division of albumens in stomach juice, and changes in the content of substances of a peptide character in the urine of patients with burns.

Chromatographic techniques were used for the more detailed characterisation of cholesterol esters, tri-glycerides and plasmatogens in blood. Further reports dealt with the problem of the composition of the lipopeptide complex isolated from the brain liquid of schizophrenics, with the corticosteroids of human suprarenal glands, and with the metabolism of cortisole and cortisone.

Several contributions summarized experiences with the fluorometric determination of gentisic acid and the polarographic evaluation of homogentisic acid in biological material. Similarly summarized was the prognostic importance of the quantitative determination of indole melanogens and non-nitrogenous phenolic melanogens. The practical extractive division of coproporphyrine and protoporphyrine, as well as the problem of gall bladder porphyrines and their precursors afforded a further knowledge of these substances.

Among other biologically important substances, attention was given to the origin and function of imidazolaacrylic acid in the epidermis and in perspiration, to the mechanism of filtration and secretion of creatine and the transformation of bromosul-phophthaleine in the liver under various pathological conditions. The final report dealt with a new method of polarographically determining gold in biological material.

Even in this section, the strongest as far as the number of reports was concerned, a considerable topical unevenness could be observed. However, the ever increasing endeavor among workers to introduce modern techniques into clinical practice can only be welcomed since it is so important for the further precisioning of diagnosis.

Section 11 -- Biochemistry of Nutrition and Food.

In all, 13 reports were presented in this section. The initial report was devoted to the study of proteolytic processes which take place in the digestion of rye flour. Further reports had similar contents with more detailed concentration on the spectrum of rye albumens and mucous substances which were closely observed by means of an electroforetic method. The summary of the paper presented by Blattna and Manouskova indicates the possibility that stable compounds of highly non-saturated fatty acids may be prepared

with urea [mocovina] as a handy way to prepare these important acids. Closely allied with this subject was the new simple technique of evaluating the anti-oxidant activity of several substances which block lipoxidation.

Worth mentioning among the further reports are the evaluation of the nutritional importance of ascorbigen; the utilization of glucoso-oxidase for the protection of L-ascorbic acid in foods; the application of retarders for the preservation of fruit and vegetables; and the strontium-90 content in commercial milk as well as possibilities of its removal. The importance of determining fluorine and residual organophosphate in foods was the subject of further analytical contributions.

### Section 12-- Biochemistry of nervous and humoral regulation.

The following four works were presented in this section:

Schreiber and Kmentova (Department of general Medicine, Karlova University) studied adenylophosphatases. It was determined that these have two optimum pH's (5-5.5 and 9-9.5). The acid phosphatase of adenylophosphatase is blocked with 2% formol,  $10^{-3}$ M copper sulfate and  $2 \times 10^{-2}$ M d-wine acid. These enzymatic poisons also considerably limit the activating effect of the non-albumen fraction of hypothalamic extract on this acid phosphatase.

Jirousek demonstrated the influence of iodide, thyroxine and allyl thio urea on the growth of the thyroid gland. With a combination of these substances, he obtained continuous curves from 50% to 400% of the usual weight.

Two papers from the Physiological Institute of the CSAV dealt with the regulation of a muscle in the normal stage and after denervation. In the first paper, Bass and Hudlicka showed that a muscle after denervation does not utilize fats like an ordinary muscle at rest. Instead, it uses saccharides, perhaps even fats accumulating for synthesis. The body regulates the acid consumption in a normal muscle at rest by means of the blood supply, whereas in a denervated muscle, the latter's own regulation comes more into play. Glucose consumption is regulated even in a normal muscle by its own regulating factors, while after denervation the effect of additional blood supply is negligible.

In a further paper, Gutmann and Zak determined that 15 days after denervation the absolute quantity of DNK in the muscle increases while the quantity of RNK remains unchanged. Following this the quantity of RNK decreases and, later, after the 210th day, so does the quantity of DNK. When a normal muscle is stimulated, albumens and RNK are reduced. Then both resynthesize and exceed their original content, first the RNK, later the albumens. In a denervated muscle the RNK's react the same way, whereas albumens do not ex-

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ceed their original content. A similar dissociation between the fluctuations of RNK and albumens of denerved muscles occurs even when taking on food after a long period of hunger.

Section 13 - Biochemical Pharmacology and Toxicology.

The majority of the 15 reports of this section, which met on the last day of the conference, advanced new proposals, especially for workers in the field of pharmacology, legal toxicology and practical medicine.

Considerable interest was enjoyed by contributions which dealt with the influence of chloroform on the elimination of chloride ions and the transformation of tri-chloroethylene in the human body. Changes in the tissue contents of lipoid substances, glycogen and L-ascorbid acid, after experimental administration of salicylates, further increased the biological knowledge of this process. Similarly, the following papers which dealt with experiments on biochemical changes in the body under the poisonous influence of tetra-chlormethane, mercury and doses of digitoxine, pointed to notable other changes in the metabolism of glycidies, lipides, and mineral substances.

A valuable contribution was the analysis of a suitable method for determining the level of carbonyl hemoglobin in cases of carbon monoxide poisoning, such as with illuminating gas. Further papers devoted their attention to changes in the curative effect of pethidine in rats following irradiation; to the comparative effects of some new chemo-therapeutic sulfapyridazines; to the isolation of new antistocid substances (i.e. destructive of protozoa) from hawthorne flowers; to certain properties of an endothelial putty-like substance, isolated from the aorta of cows; and finally, to the chromatographic determination of antihistamines and ataractics.

The concluding speech of the conference was held by Academician Sorm, the chairman of the Czechoslovak Biochemical Society. He evaluated the convention and emphasized the importance of further study in depth of the biochemistry of living substances. He noted the absolute necessity of maintaining pace with world science and continuously improving the methods and proficiency of our biochemistry. He emphasized that it will be necessary in the future to devote more and more time to the basic macro-molecular substances of living matter, especially to the broad study of albumens and nucleic acids. This is the surest way for us to reach our goals in biochemistry and the biological sciences. The intervention in the development of living organisms is controlled by them. Finally, he thanked all participants and organizers of the conference. As far as organization is concerned, the conference was carefully prepared.

The conference took place in a friendly spirit and the majority of the reports were on a high level. Nevertheless, a more

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critical selection of reports might have been better. In many cases, a better delivery and the elimination of less important details would have been beneficial. A conference of this type should, among other things, be considered a lesson in public delivery and a training school for experts, especially for the younger workers. Also the discussions of certain reports and of certain sections were not very lively and were not always sufficiently stimulated by the chairman. It would certainly be useful for the organizers and chairmen of the convention to meet afterward for an evaluation and for the purpose of selecting suitable reports for the 1961 international biochemical congress in Moscow; finally also to draw conclusions from the experiences for the purpose of preparing another conference. A question might be, for example, whether to hold a symposium or one-day biochemical meeting. If for this evaluation a personal meeting is not possible, opinions may be gathered by means of a questionnaire.

Summaries of the individual talks were published in an attractively printed volume which everybody obtained at the beginning of the conference, together with the program and other printed material. Unfortunately, these summaries were not available in sufficient numbers for all participants.

The tasks to which great attention is being paid in Czechoslovakia are the following: The theoretical and practical study of the structure, synthesis and composition of albumens and nucleic acids, for example in their relationship to their structural laws, to malignant growths, the occurrence of antibodies, the creation of live matter, problems of inheritance, the study of viruses, etc. Here also belong a number of medical and agricultural problems. A number of other problems touch on the metabolism and effectiveness of medical preparations, especially antibiotics, the transformations of sugars, lipides, steroids, mineral substances, poisons, etc. Great attention was paid to several experimental methods and their development, as for example chromatography, electroforesis, polarography, isotope techniques, medical diagnostic methods, the use of physical and physical-chemical methods in biological work, automation, the upgrading of laboratory work quality, etc. However, the biological, chemical and medical sciences still have a long way to go in their study of the chemical composition of living matter, especially the high molecular substances (albumens, nucleic acids, etc.) and the study of the organization of living matter and live substances. A great task also lies ahead for probing into the influence and control of the integral exchange of matter, as well as into physiological functions and their relationship to the problems of inheritance, health, development and growth; and the biological balance between nature, agricultural and industrial production, and human society.

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17TH NATIONAL CONFERENCE OF THE CZECHOSLOVAK CHEMICAL SOCIETY  
OF THE CZECHOSLOVAK ACADEMY OF SCIENCES

Following is the translation of an article by Frantisek Santavy and Milos Melichar in Vestnik Ceskoslovenske Akademie Ved (Activities of the Czechoslovak Academy of Sciences) Vol 69, No 5, Prague, 1960, pages 536-539.]

The above-mentioned society organizes annual conferences of chemists in various places of the Republic. After Gottwaldov (1958) and Banska Stavnica (1959), Olomouc was selected for 1960 and the Olomouc chapter of the society was entrusted with the organization of the conference, to last from 31 August to 3 September 1960. Co-sponsors were the rectorate of the Palacky University of Olomouc and the Czechoslovak Society for Applied Science.

Natural substances, the main topic, was chosen by the society as a result of directives received from the 11th Congress of the Communist Party of Czechoslovakia and from the resolution of the 11th Plenary Session of the CSAV [Czechoslovak Academy of Sciences] which more closely details the tasks of science and chemistry for the third Five-year plan. During the latter, the chemists will have jobs to do in the field of organic and inorganic chemistry, in biochemical health problems, in research in the composition and function of living matter, and in chemical products for industry and agriculture. All these questions, having to do with the systematic recognition and utilization of natural substances, made up the main theme of the conference. At the same time, it is also necessary to think of the hygienic side of industrial chemistry. This was developed in a separate section of the conference.

The preparations committee of the Olomouc chapter consisted of the following: Professor Doctor F. Santavy, chairman; Prof. Doctor M. Kuras, vice-chairman; Engineer M. Fiala, vice-chairman and treasurer; Docent Dr M. Melichar, secretary of the conference (beginning March 1960 following the death of engineer E. Kulpa). Members of the Committee: Dr M. Cernoch, Dr J. Ctvrtnik, master of philosophy; J. Gregorek, Dr L. Hanzlian, Engineer R. Kubicek, Dr B. Lang, Engineer K. Langer, Dr M. Maturova, Dr A. Nemeckova, Engineer J. Pospisilova, H. Potesilova, Dr V. Preininger, Docent Dr E. Ruzicka.

The honorary chairmanship of the conference, with the chairman of the Association, Academician R. Lukes at the head, was formed by prominent representatives of Czechoslovak political, cultural and scientific life.

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On 8 August, at 9 A.M., the conference was opened by R. Lukes, chairman of the Association. 390 chemists were present at the festively decorated Fucik Hall in Olomouc. Prof Dr F. Santavy, chairman of the preparations committee, greeted the official representatives: Academician Lukes, CSAV; Corresponding Member Gregor, SAV /Slovak Academy of Sciences/; Engineer Barica representing the Slovak sections of the Society; Prorector Prof Dr Matousek, of the Palacky University; Docent Dr Schober, of the medical faculty of Palacky University; Dr J. Ctvrtnik (Society for Applied Sciences); F. Rehacek (City and Regional Committees of the Communist Party of Czechoslovakia, Olomouc); Ministry for the Chemical Industry (Docent Hering); Health Ministry (Deputy Minister Jaros), Minister of Education (Dr. Engineer Komarek); Ministry for Food Industry (Engineer Karas); and foreign guests from the USSR, Poland, Hungary, and the GDR.

At the opening, greeting telegrams were sent to Comrade A. Novotny, President of Czechoslovakia; Minister, Academician Nejedly, President of the CSAV; Academician Siracky; Academician Sorm; Academician Heyrovsky; the Mendelejev Chemical Association in Moscow, and the Conference of the Czechoslovak Biochemical Society being simultaneously held in Prague.

Following the welcoming addresses by foreign and domestic guests, Prof Dr Santavy spoke of the significance and purpose of the conference. He particularly noted that the sessions of the conference are aimed at fulfilling the extensive tasks so important for the building of socialism in our national life, which the third Five-Year Plan has imposed on all sections of chemical research, education and industry under the motto of Chemization and Automation. Basic for the fulfillment and overfulfillment of the tasks is an active linking of science with practice and a lively collaboration of all chemical and allied fields, as well as the practical utilization of even the smallest discovery or forgotten observation. Technical development of chemical production has to be assured by the elaboration and introduction of new manufacturing processes and the perfection of existing processes. The speaker also pointed out that the City of Olomouc forms a not entirely accidental setting for the national chemical conference, what with its almost 400-year old Palacky University and its various chemical factories, such as Farmakon (chemical and pharmaceutical manufacturing), the Milo Works (chemical processing of fats), distilleries and canning plants (fermentation chemistry).

Academician Lukes's talk on "A few aspects of the biogenesis of alkaloids" proved to be the introductory leitmotif for all conference papers on natural substances. Not only did the talk bear witness to the rich experiences of the author, which he beautifully linked with the latest knowledge in this field, but it also pointed to the practical significance of the biosynthesis of alkaloids.

The opening day was ended by the showing of an instructive and scientifically very valuable film from the Chemical Institute of the CSAV: "Preparatory Micro-Methods in Organic Chemistry."

The further sessions, held in the mornings of September 1, 2 and 3, always in the beautiful atmosphere surrounding the new theoretical Institutes of the Medical Faculty at the Palacky University, were divided

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into four subject sections, each section working independently. In all, 21 main reports and 105 papers were read. For their review and programming, the section chairmen deserve praise. We shall here merely list the names of authors and the titles of the most important reports, so as to indicate the main guide lines of the various sections. Reviews and summaries of all talks are printed in the 106 page Review of the Conference. All participants received it in time, before the beginning of the conference. It is available in all state libraries.

First Section: Chemistry of Natural Substances of plant and animal origins. Chairman: Dr Engineer V. Cerny. The purpose was to show the direction which this important part of our research now takes. The main reports were given by: J. Slavik (A review of the work done in Czechoslovakia in the field of alkaloid chemistry). M. Suchy (Review of work done at the Institute for Organic Chemistry and Biochemistry, CSAV in the field of sesqui-terpene chemistry.) J. Tomko et al. (Veratric Alkaloids). This section also heard the reports of several foreign guests (Prof Dr B. Bobranski, Prof Dr Mayer, and Dr Dassler).

2nd Section: The determination of the composition of organic compounds by means of physical chemistry. Chairman: Dr P. Zuman. This section's sole task was to acquaint large numbers of scientific and specialized workers with the latest progress in this field, particularly in regard to natural substances. The talks in this section enjoyed the greatest and well deserved attention of the participants.

The main papers were read by P. Zuman (The Use of Physical Chemistry for Determining the Composition of Organic Substances). M. Horak (The Use of Infrared Spectroscopy in Organic Chemistry). Mr F. Hanic (The Use of X-ray and Neutron Structural Analysis in Organic Chemistry). K. Blaha (Plane Rotation of Polarized Light). Mr R. Zahradnik (The Use of Chemical Kinetics for Determining the Composition of Organic Substances). P. Zuman (The Use of Polarography for Studying the Composition of Organic Substances and Intermediate Products).

Third Section: The session on fermentation chemistry, under the chairmanship of Prof Dr J. Dyr, mainly dealt with the systematic identification and practical utilization of biosynthetics, important for agriculture and therapeutics.

The main papers were read by: J. Dyr (Fermentation Chemistry, its Technology and Outlook). J. Dyr, J. Mostek (Non-biological Clouding of Beer). V. Gregr (The Production of Seed Albumens by Means of Fermentation). M. Harold (The Preparation and Importance of Anti-biotics Outside of Medicine). J. Leopold (Production by Fermentation of Organic Acids). J. Hanus and V. Munk (Vitamin Production by Means of Fermentation Processes) Mr P. Rach (Enzyme Production by Means of Micro-Organisms). O. Hanc (Micro-biological Processes During the Synthesis of Steroid Hormones and their Derivatives).

4th Section: Subject: Chemical engineering processes from the viewpoint of hygiene and labor safety. In the absence of Prof Dr Teisinger, Dr P. Pachner occupied the chair. Keen attention was paid to the numerous problems of basic importance to the health and working

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efficiency of the population. Foremost among these is hygiene and worker safety as influenced by the chemization [This is a new word, apparently coined behind the Iron Curtain] and automation of all industrial production, and even of agriculture.

The main papers were read by: V. Vasak (Analytical Methods for Determining Harmful Substances in the Atmosphere of Manufacturing Establishments). Mr J. Marhold (Toxicology and Industrial Hygiene Considered as a Technical Subject).

The conference was concluded by a joint session of all sections, held during the noon hours of 3 September 1960. Engineer J. Jelinek, scientific secretary of the Association, read the resolution and report of the committee, which, after discussion and suggestions by the participants, had evaluated the conference proceedings (Composition of the committee: Lukes, Jelinek, Bauer, Cerny, Zuman, Dyr, Pachner). We cite a number of passages from the resolution and the report:

"The conference participants recommend:

"...beyond the conference, symposia should be held on the subject of stereo-chemistry, reaction mechanisms, the thermodynamics of chemical processes, the relationship of physical-chemical constants to the composition of chemical substances, and problems of physical chemistry, i.e., theoretical chemistry;"

"...postgraduate training of Czechoslovak chemists should be carried out in a standard manner in cooperation with the Czechoslovak Chemical Society of the CSAV and in close contact with workers of the CSAV, SAV, Universities, etc.;"

"...universities and technical schools should acquaint their students in the various specialties with the hygienic aspects of technology and the use of products by giving lecture courses on industrial hygiene and toxicology;"

"...the ministries of Health, Agriculture, Chemical Industry, and Food Industry should devote increased attention to industrial health protection and to the use of chemicals for plant protection and as pesticides."

"Dividing the contents of the conference into four sections according to subject matter has proved out quite well."

"...The scientific and technical quality of the conference sessions was on a level with the large international conferences. Conference organization was very good; the devoted work of all members of the preparations committee was recognized and praised by all participants in the conference."

The working program of the conference was followed by social and cultural activities. The official representatives of administrative offices, as well as foreign guests, had already on the first afternoon of the conference been greeted at a reception by Comrade F. Rehacek, chairman of the MENV Olomouc - [the city and district representative of the central committee of the Communist Party]. The Philharmonic Orchestra of Moravia gave a concert for the participants with the presentation of B. Smetana's Ma Vlast. Well attended also were field trips to plants in Olomouc (Farmakon, Zora), trips to the neighboring countryside (Kromeriz, Bouzov, Sternberk), as well as a visit to the National Flower Show in Olomouc.

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The social life of the conference was concluded by a social evening.

On the occasion of the national conference in Olomouc, the Czechoslovak Chemical Society of the CSAV called into session the central committee of the Society (1 September), as well as the annual meeting of the Society (1 September 1960). The conference sessions were reported in the daily press. Also, several of the conference papers were broadcast on the radio.

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