INSTITUTE OF ANALYTICAL CHEMISTRY, CZECHOSLOVAK ACADEMY OF SCIENCES, BRNO

BRNO, LENINSTREET 82
CZECHOSLOVAKIA 66228

A BOOKLET OF DATA

CONTENTS

Preface 3
Greetings letters 5
Twenty years of the Institute 13
Personal details of the staff of the Institute 20
Employees of the Institute 26
Long-term scientific stays in the Institute 31
Theses 35
Patents 37
Collective honours, personal prizes and awards 40
Publications of a monograph character 43
Scientific and other publications 44
Scientific and educational films 64

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PREFACE

This brochure gives a review of the activities of the Institute of Analytical Chemistry of the Czechoslovak Academy of Sciences during the last 20 years. It is our hope that this record will make it possible for the scientific and general public to evaluate the results and efforts which a relatively small collective has contributed to the development of one of the important branches of modern analytical chemistry. At the same time, we would like this publication to contribute to the information of those who are interested in postgraduate forms of scientific education and who come to the Institute from Czechoslovakia and other countries for periods of study.

The rapid development of science that took place after World War II was also reflected in the policy of Czechoslovakia and, in addition to other steps, led the Communist Party and governmental organs to found the Czechoslovak Academy of Sciences in 1952. As a part of the experimental basis of the Academy, a special laboratory was set up in Brno in 1956 whose

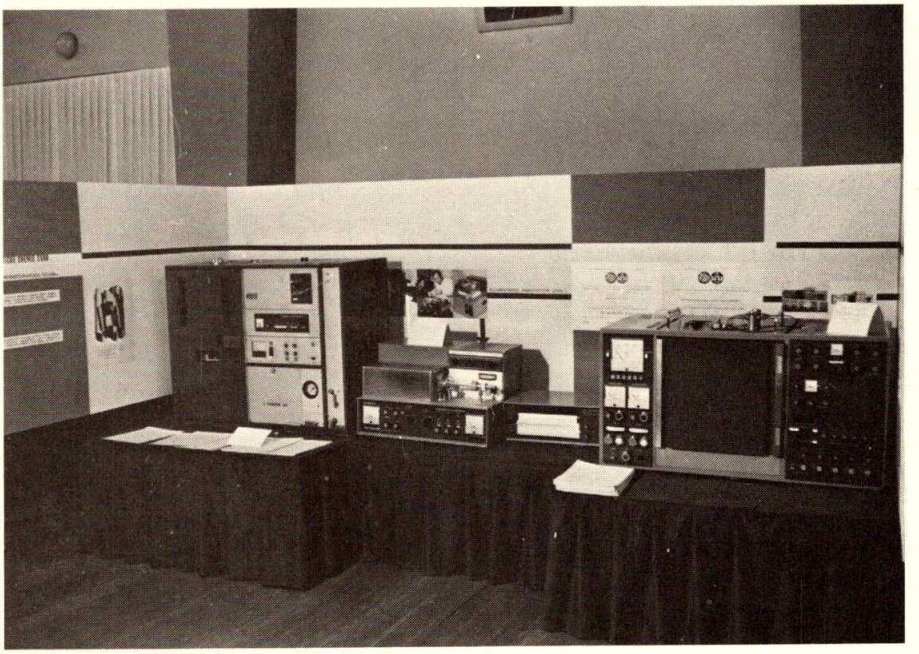

Fig. 1. Exposition of the instruments designed in the Institute of Analytical Chemistry at the whole-State exhibition organized by the Czechoslovak Academy of Sciences on the occasion of the 30th anniversary of Czechoslovakia. The instruments are manufactured industrially by Laboratory Instruments, N.E., Prague, and represent the fundamental and innovation programme of this enterprise (from left to right: L CHROM-50 liquid chromatograph, CHN-1 elemental analyzer and CHROM-5 gas chromatograph).

task was to conduct fundamental research in the field of gas analysis. This laboratory developed into its present form as the Institute of Analytical Chemistry of the Czechoslovak Academy of Sciences.

We try to repay the investment made by our society in our scientific collective. From the beginning of its work, the collective has been aware of close ties between scientific work and the industrial production basis of a socialist state. Therefore, our efforts have been always directed at the solution of the basic theoretical problems which, at a given stage of development of analytical chemistry, could provide important contributions to our society. Our contributions have been recognized by scientists in Czechoslovakia and elsewhere and they have made it possible to develop effective international cooperation, especially within the Council for Mutual Economic Aid (COMECON). This is the reason why we appreciate the recognition of our work by our society, which was shown by the number of honours awarded to individuals and to the whole collective.

This publication, issued on the occasion of the 20th anniversary of the Institute, represents for us a recapitulation of our activities before we enter a new stage of our work. Our socialist society, which considers the scientific and technical revolution as one of the integral parts of its development, sets before us new and often very complicated and demanding tasks. We consider the fulfilment of these tasks to be our commitment and our duty.

Our thanks are due to Mr. and Mrs. Clark Hamilton for their cooperation in the preparation of the English version of this publication.

ING. RADIM VESPALEC
Chairman of the Trade Union Organization of the Institute

DR. JAROSLAV JANÁK
In charge of Scientific Board and the Collective of the employees of the Institute

GREETINGS LETTERS

On the occasion of the 20th anniversary of the establishment of the Institute, a number of letters have been received from our many colleagues and friends. At the same time, a special volume of the Journal of Chromatography, Vol. 119, was published, including 62 contributions by 169 authors from 19 countries throughout the world, dedicated to our anniversary.

Here, personal greetings letters by the following notable representatives of science, management and industry are presented:

1 Corresponding Member of the Czechoslovak Academy of Sciences A. Vlček, Member of the Praesidium of the Czechoslovak Academy of Sciences, in charge of the chemical sciences, Prague, Czechoslovakia;
2 Corresponding Member of the Academy of Sciences of the U.S.S.R. V.L. Tal'roze, President of the Permanent Working Group for Scientific Instruments of COMECON, Moscow, U.S.S.R.;
3 Prof.Dr. A.I.M. Keulemans, Director of the Institute of Instrumental Analysis, Technical University, Eindhoven, The Netherlands;
4 Prof. V.G. Berezkin, D. Sc., and Prof. A.A. Zhukhovitskii, D.Sc., both representatives of chromatographic schools in the Academy of Sciences of the U.S.S.R., Moscow, U.S.S.R.;
5 Prof. A.V. Kiselev, D. Sc., and Prof K.D. Shcherbakova, D. Sc., representatives of the chromatographic school in the Lomonosov State University, Moscow, U.S.S.R.;
6 J. Oberhel, Manager of the National Enterprise, Laboratory Instruments, Prague, Czechoslovakia; and
7 Prof.Dr. M. Lederer, Rome, Italy, Editor of the Journal of Chromatography, Amsterdam, The Netherlands — an introduction to the Special Volume 119 (1976) of the Journal of Chromatography.

Analytical chemistry has always played a key role in the development of chemistry, both in fundamental research and in industrial practice. This discipline, like any other, has passed through various stages of development, making use of knowledge gained in other disciplines of chemistry, and has often provided impulses for developments in other branches of science. The trend in modern analytical chemistry is to abandon the purely chemical approach and to move towards physico-chemical and physical principles. These are the only principles that can help analytical chemistry to resolve the problems posed by the current development of science. This involves the evolution of accurate and rapid qualitative and quantitative methods of characterizing substances in complex mixtures, with the possibility of using minimal amounts of the substances and of providing results that can be processed automatically and be used for process control purposes.

These problems can only be overcome if a knowledge of chemical and physico-chemical principles is combined with the technical resolution of difficulties connected with modern instrumentation.

This approach, which is more or less taken for granted these days, was in many respects new in the period immediately after the World War II, and was not always fully accepted. So much the greater, then, is the significance of the fact that these were the principles on which the then Laboratory for Gas Analysis of the Czechoslovak Academy of Sciences (which developed into the present Institute of Analytical Chemistry) had started to work even in 1956. During the 20 years of its existence, despite its relatively small size (about 30 staff), this Institute has won respect both in Czechoslovakia and elsewhere.

The Institute is involved in the resolution of a number of significant assignments in Czechoslovakia, but is also an important partner in international cooperation, particularly with the Academies of Sciences of the socialist countries and in the programme of COMECON. Its cooperation with Czech companies in the development and manufacture of laboratory measuring instruments, particularly in the field of gas and liquid chromatography and elemental analysis, is also of no small importance.

The success and recognition of the Institute's activities are also connected with the fact that the problems it has tackled, up to present involving predominantly chromatographic separation methods, have always been so oriented by its management as to retain as their aim a link between research and practice.

The Institute has in the past obtained a number of important results and these were always deservedly recognized both in Czechoslovakia and elsewhere. The further development of the socialist society imposes on the Institute new and greater tasks, which will require the utilization of new physical methods and new principles for the construction of improved instruments. The activity of the Institute will be aimed more at environmental protection, medicine and the biological sciences. In cooperation with other Institutes of the Czechoslovak Academy of Sciences, the Institute of

Analytical Chemistry should make a significant contribution to innovation in automation and process control for the further development of the chemical industry. In addition to the above tasks, the Institute should provide a theoretical basis for analytical methods of research.

On the occasion of its 20th anniversary, I should like to congratulate the Institute and all of its workers on their past work, and to wish them many further successes from which the development of society could benefit.

A. VLČEK

Scientific and technical progress in research in chemistry and the chemical industry is mostly determined by the effectiveness of the methods applied for investigations and analyses. The development and widespread application of gas chromatography have led to revolutionary changes in the analysis of multicomponent mixtures and impurities. Gas chromatography nowadays appears to be major analytical method for the analysis of volatile organic compounds and gases.

The work of the scientific collective of the Institute of Analytical Chemistry of the Czechoslovak Academy of Sciences, headed and organized by Jaroslav Janák, has made a substantial contribution to the development of chromatographic methods. The early work carried out by Janák in the early 1950s, when only 10—20 research workers in the world were involved in the field of gas chromatography, gave rise to the development of the gas chromatographic analysis of gases, which was a new technique at the time and very significant. These early studies characterized Janák as an original research worker and ingenious experimenter, solving very efficiently both practical and theoretical problems.

Simultaneously with the intensive scientific activity, Janák paid great attention to the organization of the Institute, whose anniversary we are celebrating this year.

The work of the Institute is known throughout the world. Research work carried out by Janák and his co-workers M. Krejčí, J. Novák, K. Tesařík, H. Dubský, M. Dressler, V. Rezl and many others, has contributed substantially to the development of chromatographic methods and has been widely acknowledged. The great attention that the Institute has been devoting continuously to the education of young scientific workers and to scientific cooperation is also noteworthy. A large number of scientists from many different countries have attended courses of instruction and participated in the scientific work of the Institute.

In conclusion I should like to wish this young, widely known and seriously respected organization many further creative successes.

V.L. TAL'ROZE

It gives me extreme pleasure to write a few notes on the occasion of the 20th anniversary of the Institute of my friend Jaroslav Janák and his team. At the same time, I am somewhat embarrassed to offer congratulations to a contemporary and yet younger *alter ego* and to his Institute.

What is an institute? According to the Concise Oxford Dictionaries an institute is a "society, organization, for promotion of scientific or other object; building used by this". The keyword occurs to be "society", which can be defined as "leisured, well-to-do people, or fashionable persons regarded as distinct part of community", or alternatively, "association of persons united by a common aim or interest or principle". Deleting a few words from the first definition, an amalgamation of the two definitions may well fit our purpose. Hence the congratulations go to the Institute as a society. However, it is impossible to write about this society, without bringing its Director into the limelight, just as it would be a misjudgement to ignore his co-workers.

My thoughts go back over more than half a century when I attended concerts during my youth, given by the "Concertgebouw Orkest", conducted by Willem Mengelberg. Education, explanations and afterwards questions were my purpose, and on my questioning the role of the conductor to my great surprise I was invited to tea at the famous conductor's home. It lasted a full hour, at the end of which the role of a director had been made abundantly clear to me and it still is to day.

Again my thoughts go back about two decades. The Institute of Petroleum organized the First International Gas Chromatography Symposium at the Faraday Society in London. It was at this Symposium that I met Janák for the first time. From his multitude of publications (not easy to read in Czech) I had somehow formed the impression that the author would be a middle-aged person. I was greatly surprised to meet a young colleague; and today, almost 20 years later, he still impresses me by his perpetual youth. It was the first personal meeting, the start of a long series of mutual visits between our Institutes and exchanges of scientific staff and co-workers. The 20th anniversary of Janák's Institute must almost coincide with the 20th anniversary of our personal acquaintance.

As mentioned earlier, the Director alone cannot be identified with the Institute, the co-workers being of equal importance: orchestras may appear to exist and flourish without a conductor, but a conductor with no orchestra is lost. At the same time, the Director chooses his co-workers and carries the responsibility. The publications of Janák's Institute show many recurrent names but also new names from time to time.

The ground that is covered by the Institute can be described as "modern analytical methods of separation", evidently following the pathways laid down by the father of the technique, A.J.P. Martin. This certainly does not mean that the Institute has been copying Martin's ideas. Here again, my thoughts go back to an occasion when A.J.P. Martin paid a visit to the Shell Research Laboratories in Amsterdam. As usual there was a shortage of time, but in spite of this, Martin spent several hours at a version of the fully

automated "Janák" arrangement and he praised Janák as one of the very few original thinkers.

What remains to be said? The Institute has, over the past 20 years, been involved on the one hand with all possible applications that modern analytical techniques can offer to industry, and on the other hand has contributed to social life, *e.g.*, environmental protection, public health, clinical chemistry.

In agreement with the remit "modern analytical methods of separation", Janák and co-workers have always been ready to adopt innovations (*e.g.*, isotachophoresis). To me, the characteristics of the Institute could be summarized as follows:

a perfect organization;

a friendly society of distinguished scientists;

a centre, not only for Eastern Europe, but also for the whole world.

It is my sincere wish that the Institute will continue to flourish and, moreover, that its work in a new building in the future will be representative of the high standards of the Director and his co-workers. Twenty years is an anniversary; twenty-five years is a jubilee. That the forthcoming jubilee will be celebrated in a new building and that my wife and I shall see it happen makes a happy ending to this personal contribution.

LOU (A.I.M.) KEULEMANS

It is the middle of the 1950s, and the golden age of gas chromatography is yet to come. Only a short time has elapsed since the publication of the classic work on this subject by Martin and James. Practically speaking there exists no work on the subject of gas chromatography. Distillation is the prevailing method for studying mixtures of organic compounds, both in industry and in the laboratory. It is at this time that there appear in Czechoslovakia specialists in the field of chromatography; new branches of study are developed in a short time; original pieces of work are published; gas chromatographs begin to be manufactured.

One of the first to grasp the significance of chromatography and its role in present-day science and industry, displaying enormous scientific and organizational activity in this field, was Jaroslav Janák. He invented a very interesting volumetric detector, which became widely used in Czechoslovakia and elsewhere. He wrote a very important series of papers on the separation of gases, and he and his co-workers have covered in their publications almost all aspects of the theory and practical application of gas chromatography, including the separation of complex mixtures, the analysis of mixtures and elemental and functional analysis.

Prof. Janák was the central figure of a group of energetic and distinguished research workers that included Miloš Krejčí, Josef Novák, Karel Tesařík and Hanniel Dubský. There came into being a unified collective of scientists whose

work not only determined the rapid tempo of growth and the great success of chromatography in Czechoslovakia, but also had a strong influence on the development of chromatography in general.

It is characteristic of the work of this school that high scientific standards are closely combined with practical work and a feeling for the development of new and progressive techniques. Thus, in the last few years, successful development work has been carried out in the field of liquid chromatography. The extensive and fruitful efforts of the scientific collective in the popularization and expansion of gas chromatography also deserve a mention. Symposia on gas chromatography have been organized in Czechoslovakia for about 20 years. Many scientific workers from various countries have made contact with each other at this Institute. The workers of the Institute have published many reviews and books on chromatography.

Whenever we visit this collective, it is with a feeling of pleasure. The working atmosphere is lively and friendly. We always learn something new and interesting from our Czech comrades, and always acquire a little more knowledge.

V.G. BEREZKIN
A.A. ZHUKHOVITSKII

We first came into contact with the Institute of Analytical Chemistry some time ago, when it was still the Laboratory for Gas Analysis. Even at that time we found in this small laboratory much that was instructive, in respect of both the development of new methods for research in gas chromatography and of well organized scientific information.

Since then, the laboratory has grown rapidly. At each visit we have seen something new, with evidence of its continuing development. Analytical applications and the development of chromatographic instrumentation are the two main features of the work of the Institute. Over the past few years, intense efforts have been made successfully to solve problems such as the utilization of capillary columns for the complex analysis of multicomponent mixtures, trace analysis, environmental analysis, analyses of exhaust gases, analysis of expired air, the design of new detectors and instruments, not only for gas chromatography (including instruments for elemental analysis by means of gas chromatography) but recently also for liquid chromatography, and isotachophoresis.

Even in the early days, Dr. Janák paid great attention to scientific information. This service has now expanded into a model information centre which is, in our experience, second to none.

We sincerely wish the Institute continued success and growth, and hope for the establishment of closer contact with the chromatographic laboratories

of the U.S.S.R. We would like cooperation to develop along the lines of a division of work according to our complementary specializations.

A.V. KISELEV
K.D. SHCHERBAKOVA

The first and fundamental stage of the development of science and technology is research. Research helps to solve the problems that arise from the needs of society, many of which lead to new scientific and technical solutions. The results of research find social realization through research and development institutes and in the sphere of manufacture.

Research into laboratory instrumentation is the main task of the Institute of Analytical Chemistry, and its work involves studies on modern methods of gas analysis, efficient liquid chromatography, elemental analysis and analytical isotachophoresis. Its organizing and educational activities are mainly reflected in wide international cooperation, the Institute having been selected as the leading organization in the field of chromatographic instrumentation for the COMECON countries, and in the postgraduate education of new specialists in this field.

Applied research and the practical application of research in the field of analytical scientific and laboratory instruments is carried out in Czechoslovakia in cooperation with other organizations, such as the National Enterprise, Laboratory Instruments, Prague. A long period of close cooperation between the staffs of the Institute of Analytical Chemistry and Laboratory Instruments, N.E., has given rise to the development of new laboratory instruments and their introduction into production and widespread use. The resulting instruments are used in various branches of the national economy — in the chemical and food industries, in the medical services and in engineering. That the basic research is being carried out along the most useful lines is indicated by the fact that, in spite of annual increases in production, Laboratory Instruments, N.E., are still unable to satisfy the requirements of the home and foreign markets. For this reason, Laboratory Instruments, N.E., welcomed a proposal initiated by the Director of the Institute, Jaroslav Janák, that the company should be expanded by the opening of a new plant at Polná, near Jihlava. This would make a significant contribution, in conjunction with the company as a whole, to the fulfilment of the resolution of the May Plenum of the Central Committee of the Communist Party of Czechoslovakia, which was adopted by the Czechoslovak Government. This charged certain Ministries and the Czechoslovak Academy of Sciences with responsibility for a development programme in the field of scientific instruments for research and development. The programme was to form a part of the preparation for Czechoslovakia's sixth 5-year plan, coordinating production in this field with that of other countries of COMECON.

Future production plans of Laboratory Instruments, N.E., reflect very well the direct cooperation with the staff of the Institute of Analytical Chemistry.

Twenty years of well oriented activity of the Institute have produced significant results, proving its high social value. These results are the basis for further success in the future. The workers of the National Enterprise, Laboratory Instruments, wish the staff of the Institute much success.

JAN OBERHEL

It was in 1955 that I first made the acquaintance of Dr. Janák at the Microchemical Symposium in Vienna. This was an occasion that I had been looking forward to for some time, as the experimental simplicity and the elegance of his first papers on adsorption gas chromatography had made a great impression on me. I did not then know that this would be the beginning of such a long collaboration, including the Bibliography Section (Gas Chromatography) compiled by Dr. Janák and his group, a sabbatical year spent by him partly in the Laboratorio di Cromatografia and partly at the Istituto Superiore di Sanità in Rome and, of course, his constant collaboration together with Dr. Novák in the editorial work of the Journal of Chromatography.

The Institute to which this issue is dedicated and the Journal of Chromatography were both born at about the same time and thus it is fitting that we are able to devote a special issue to papers by present and former collaborators and by friends of the Institute to celebrate its 20th anniversary.

It hardly seems true that 20 years have already passed since those early days that Dr. Janák speaks about in his historical outline (page 13), but in a field in which something new happens continuously, the very excitement of the work makes time pass unnoticed.

May I and the Journal of Chromatography wish lots of good chromatograms and many further successful years to the Institute of Analytical Chemistry and to Dr. Janák and his collaborators.

MICHAEL LEDERER

TWENTY YEARS OF THE INSTITUTE OF ANALYTICAL CHEMISTRY OF THE CZECHOSLOVAK ACADEMY OF SCIENCES*

A HISTORICAL OUTLINE

J. JANÁK

Institute of Analytical Chemistry, Czechoslovak Academy of Sciences, Brno (Czechoslovakia)

The Institute was founded on April 1st, 1956, in Brno, Czechoslovakia, as The Laboratory for Gas Analysis of The Czechoslovak Academy of Sciences. The first staff of the Laboratory was a group of specialists detached from the Institute for Petroleum Research in Brno. The group was formed by Jaroslav Janák, Miroslav Rusek and Karel Tesařík and, on the establishment of the Laboratory, it was joined by Miloš Krejčí, Josef Novák and Hanniel Dubský.

It is possible to identify three stages in the growth of the Institute, characterizing the natural development of research from modern gas analysis and gas chromatography to the broader field of separation methods, which was further extended by selected methods of structural analysis. These stages follow the existence of The Laboratory for Gas Analysis (1956—1965), which was later changed to The Institute of Instrumental Analytical Chemistry (1966—1973) and, in 1974, to the present Institute of Analytical Chemistry of The Czechoslovak Academy of Sciences.

DEVELOPMENT OF SCIENTIFIC TOPICS AND MAIN RESULTS

The task of The Laboratory for Gas Analysis was to develop modern methods of gas analysis and perform basic research on gas chromatography. The activity was focused on research on the semimicro-analysis of gases and the development of novel methods for the trace analysis of gases. The main results were published in a series of papers on chromatographic semimicro-analysis of gases utilizing the principle of volume detection[1]. This research, which was started in 1949 by J. Janák during his activity at the chemical works near Most (West Bohemia), was further developed at The Institute for Petroleum Research in 1951—1955 and was completed at the Laboratory for Gas Analysis of the Czechoslovak Academy of Sciences in 1959 by the elaboration of a fully automated gas chromatograph. This work influenced markedly the transformation of classical gas analysis into modern gas analysis not only in Czechoslovakia, but also in other countries[2]. It has been utilized particularly for the analysis of mixtures of permanent gases with gaseous hydrocarbons in the petroleum industry and in the then developing petrochemistry, and it has also served as a teaching tool of a considerable value.

*Reprinted from *Journal of Chromatography*, 119 (1976) 3—7

The analysis of hydrogen in the presence of hydrocarbons is one of the most exact and absolute methods for its determination and is still in use.

In this series of papers, one can find most of the key elements that arose independently or were later developed by other workers in their systematic research on and utilization of gas chromatography (systems of several columns, by-pass, combination of conventional sorbents and introduction of new types of sorbents, *e.g.*, molecular sieves, trace analysis by chromatographic concentration or by elimination of the main component of the mixture, and methods of manipulation with gases). Investigations on trace analysis led to a renaissance of the frontal chromatographic principle in gas analysis and contributed to the development of an expedient method of concentration of impurities in gases[3], which has found wider use in environmental control and in space research.

With the growing utilization of gas chromatography during 1956—1966, substances with increasingly higher boiling points were studied, the basis model substances being those typical of hydrocarbon chemistry (crude oil, tar). From this research emerged some basic principles that have found wider applicability. For instance, the idea of defined pyrolysis[4], two-dimensional chromatography employing GC as one dimension in combined GC—TLC[5] and the modification of the surface of high-resolution glass capillaries[6] are of particular importance.

The task of The Institute of Instrumental Analytical Chemistry has been to develop promising variants of analytical micro- and submicro-separation methods, especially chromatographic methods, with particular emphasis on instrumentation. While the first stage of development in 1956—1965 was characterised by research into the methodology of gas chromatography and trace analysis, the main feature of the subsequent stage was serious theoretical interest in gas chromatography as a quantitative analytical method[7], the physico-chemical interpretation of the mass balance in two-phase systems, transport phenomena in porous media and the thermodynamic interpretation of retention data[8–10]. Positive results of this investigation include the discovery of the pressure dependence of the response of the flame ionization detector[11], evidence for the selectivity of the alkali flame ionization detector towards sulphur[12] and the characterization of systematic errors incidental to the work with temperature-programmed gas chromatography[13].

The instrumentation-oriented research gave results that led to the development of new instruments. An example is the design of a new instrument for the elemental analysis of organic substances based on the principle of frontal chromatography[14], which is now in commercial production at the N.E. Laboratory Equipment in Prague and has recently also been used in the analysis of gases in metals[15]. Further, the submicro-technique, which permits classical colorimetric reactions to be applied to the analysis of elements and compounds in picogram amounts by measuring the absorbance of coloured microparticles of silica gel under a microscope[16], and the modification of the Eggertsen and Nelson method for surface measurement by thermal desorp-

tion so as to permit the measurement of small surface areas in large volumes of the material, have remarkable technical importance[17]. In Czechoslovakia, conditions have been created for the industrial production of gas chromatographs of the CHROM series at the above national enterprise.

The tradition of research and the extension of the methodology used at the Institute have allowed research on high-efficiency liquid chromatography to be started, which has already yielded some useful results in the field of new detectors[18-20] and has led to the industrial production of liquid chromatographs of the L-CHROM series in Czechoslovakia. The research is now focused on the study of the effect of temperature on sorption equilibria and on its mechanism in liquid—liquid and liquid—solid systems[21].

Another major research topic at the Institute is analytical isotachophoresis. The results obtained so far have shown the possibility of achieving extremely rapid and analytically defined separations of ionic species[22]; the method is capable of displacing, in the near future, classical wet methods of analysis and of contributing to the solution of important biochemical and clinical problems. Conditions have also been prepared for the industrial production of this instrumentation at the Labor Müszeripari Mürek Works in Budapest, Hungary.

Since the beginning of this second stage of the development of the Institute, the choice of models for study has been shifting from substances typical of hydrocarbon chemistry to substances of biological interest and nowadays it forms the basis for the development of modern methodology in clinical chemistry and new methods of human and veterinary diagnostics (*e.g.*, ref. 23).

As a fringe problem, research on thin-layer chromatography was also carried out for some time, especially in connection with new gel materials[24].

The synthetic scientific work conducted at the Institute has resulted in some comprehensive reviews[25-32] and monographs, the most important of which are contributions to the chromatographic analysis of gases[33,34], quantitative analysis by gas chromatography[35] and modern liquid chromatography[36].

The main task of the Institute of Analytical Chemistry is to facilitate the progress of Czechoslovak analytical chemistry so that it can meet social demands such as the control of the environment, the development of analytical processes and operations, and also to provide a contribution to the development of the general aspects of analytical chemistry. While during 1966—1973 there was developed at the Institute a set of methods capable of isolating individual chemicals from a complex mixture of substances and of determining the amounts present, the task in the present third stage is to master the coupling of these methods with the most important methods that will permit the determination of the structure of an individual chemical individuum and the characterization of its transformations. This implies particularly the development of methods such as mass spectrometry, functional and elemental analysis, the application of computer-aided methods in chemical analysis, etc.

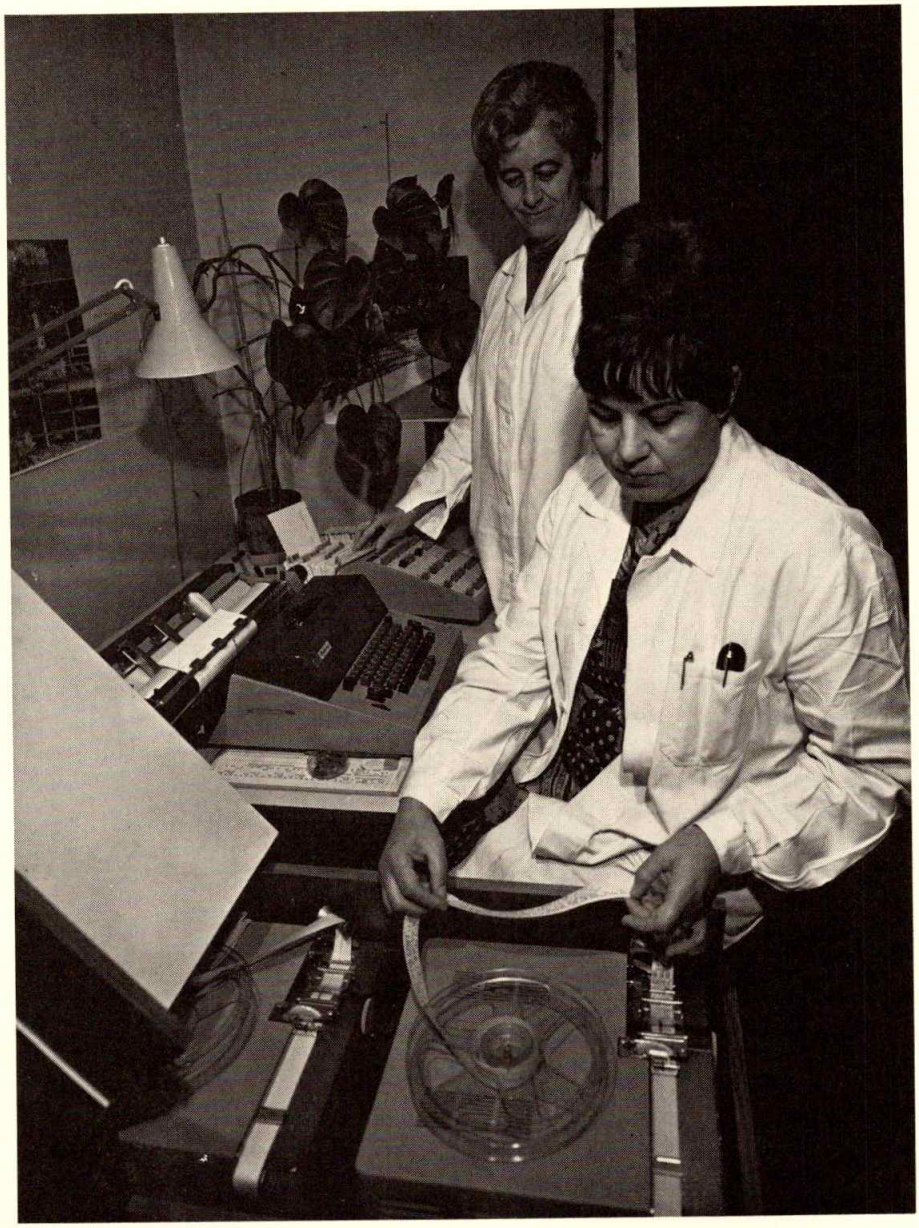

Fig. 2. Processing of the bibliographic data and indices from the literature on gas chromatography by means of a computer. Preparation of input data. The system serves as the basis for the international bibliography of the field that is published regularly in the *Journal of Chromatography* (E. Tesaříková (front) and Z. Pličková).

An integral part of the scientific activity of the Institute is the work of the documentation staff, who have provided, with high-level computer and information techniques, a bank of comprehensive information on gas chromatography and who now also follow the literature on high-efficiency liquid chromatography and analytical isotachophoresis. The material in this information bank has become sought-after material for study and, since 1963, it has also served as the basis for the bibliography that is published regularly in the *Journal of Chromatography*[37].

EDUCATIONAL AND ORGANIZATIONAL ACTIVITIES

The Institute has been contributing to postgraduate education in analytical chemistry, cooperating on a national scale with the Czechoslovak Chemical Society and the J.E. Purkyně University in Brno and, on an international scale, with UNESCO and the University of 17th November in Prague. In addition, the Institute has been cooperating as a training establishment with the international foundation, The Scientific Exchange Agreement, with the aim of supporting the development of European research on chromatography.

Every year, the Institute has organized basic courses in chromatography for graduate students who have used analytical separation methods in their work and need to obtain an integrated and deeper view of the subject. The courses are intensive, last a week, and comprise 14 h of lectures on the theory, methods and instrumentation of gas and liquid chromatography, and 36 h of practical work. Up to now, 17 courses have been held, attended by more than 500 postgraduates. In addition, summer schools have been organized on topics concerning the modern development and utilization of chromatography, intended for advanced specialists. The summer schools are of 3 days in duration and have so far been attended by 160 participants. Up to the present time, three international courses have been arranged under the auspices of UNESCO, aimed at the long-term postgraduate education of specialists coming particularly from developing countries, and these have been attended by 36 persons.

As an educational establishment in analytical chemistry, the Institute has educated a number of scientists under Postgraduate Fellowships lasting 1—5 years; there have been 42 postgraduates, including 14 from abroad.

Some members of the Institute's staff participated in the setting up of international journals, such as *Journal of Chromatography* (The Netherlands), *Journal of Chromatographic Science* (Illinois, U.S.A.), and *Chromatographia* (G.F.R.). The Institute has exerted a considerable influence on the development of the first of the above journals.

The Institute has organized several national and international symposia on advances in chromatography, which took place in Czechoslovakia or elsewhere (*cf.*, *J. Chromatogr.*, Vol. 69, No. 1, 1972), the most recent of which being held in Bratislava, Czechoslovakia, in 1974 (*cf.*, *J. Chromatogr.*, Vol. 91, 1975).

The Institute plays a leading role in the Czechoslovak State Plan for basic research in analytical chemistry and also functions as a coordinating organization for chromatography within the framework of research and development plans of COMECON countries. The Institute has elaborated a prognosis of the development in the field and a project of scientific research cooperation within the Complex Programme of the Socialist Economic Integration. These documents have been accepted internationally and have become the basis of a general plan for the scientific research activity of the COMECON countries in the field of chromatographic instrumentation. The Institute also played an initiative role in the development of the international journal *Nauchnye Pribory* (U.S.S.R.).

In the near future, the Czechoslovak Academy of Sciences intends to establish an International Chromatographic Laboratory at the Institute, which would be able to meet the growing demands of countries with different social systems for the education of specialists and the aspirations of the COMECON countries for an advanced research base.

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PERSONAL DETAILS OF THE STAFF OF THE INSTITUTE

Associate Professor Ing. Jaroslav Janák, D.Sc. (1924, Uzhorod)

He is the leading research worker and the Head of the institute. He graduated from the University of Chemical Technology in Prague in 1947, which conferred upon him the degree of Doctor of Chemical Sciences in 1965. He was appointed Associate Professor of Analytical Chemistry at the Faculty of Science of J.E. Purkyně University in Brno in 1964. He was the initiator of the foundation of the Institute and from its beginning he has been its Head. Analytical chemistry, especially the methodology and instrumentation of separation methods, gas analysis and trace analysis, are his main scientific interests. The greatest successes were achieved in gas analysis, defined pyrolysis in combination with gas chromatography, multi-dimensional chromatography, elemental analysis and isotachophoresis. Janák's contributions to the development of analytical chemistry, especially chromatography, have been recognized and rewarded with several awards and medals: Klement Gottwald State Prize in 1954; Commemorative Medal of Gdansk

Fig. 3. M.S. Tswett Award in Chromatography to Dr. J. Janák (Munich, November 1975).

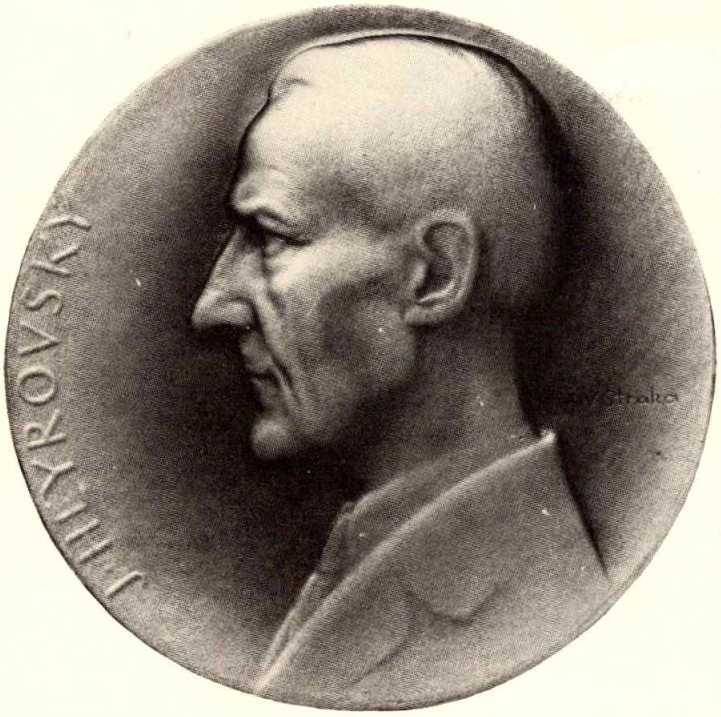

Fig. 4. Silver Plaque of J. Heyrovský for development of chemical sciences (Prague, May 1974) devoted to Dr. J. Janák.

Technical University, Poland, in 1965; J. Heyrovský Silver Medal of the Czechoslovak Academy of Sciences in 1974; the Medal of Central Committee of the Communist Party of Czechoslovakia and of the Central Committee of the National Front of the Czechoslovak Socialist Republic in 1975; and M.S. Tswett Award for Distinguished Contributions to Chromatography, Munich, in 1975. He is author, co-author or editor of 4 books and 260 original papers and holds 15 patents.

RNDr Petr Boček, C.Sc. (1941, Brno)

He joined the Institute in 1966 and is now a senior research worker and heads the research team for isotachophoresis. He graduated from the Faculty of Science of the J.E. Purkyně University in Brno in 1964, which conferred upon him the Degree of Doctor of Natural Sciences in 1967 and the Degree of Candidate of Chemical Sciences in 1969. The main field of Boček's activities were the study of pressure effects in flame-ionization detection and the statistical evaluation of quantitative techniques of gas chromatography. Since 1972 he has been engaged in the problems of rapid analytical isotachophoresis. He has published 23 papers and holds 2 patents.

Fig. 5. Commemorative Medal of the Gdansk Technical University (Gdansk, Poland, 1965) devoted to Dr. J. Janák.

RNDr Milan Dressler, C.Sc. (1940, Brno)

He is a research worker at the Institute. He graduated from the Faculty of Science of Palacký University, Olomouc, in 1964, and since then he has been employed at the Institute. He was awarded the Degree of Doctor of Natural Sciences in 1968 by Palacký University, and the Degree of Candidate of Chemical Sciences by the Faculty of Science of the J.E. Purkyně University in Brno in 1969. He has published 23 papers and holds 2 patents. His main interests were the problems of selective detectors in gas chromatography (alkali flame ionization) and the application of organic porous polymers in gas and thin-layer chromatography. Now he is engaged in the study of the combination of gas chromatography and mass spectrometry.

RNDr Hanniel Dubský, C.Sc. (1930, Brno)

He had been working at the Institute since its foundation in 1956. In 1956, he graduated from the Faculty of Science of Masaryk University (now the J.E. Purkyně University), Brno. In 1964, he was awarded the Degree of Candidate of Chemical Sciences and in 1966 the Degree of Doctor of Natural

Sciences by the same University. He took up fundamental research and studied instrumentation (mainly detectors) for gas and liquid chromatography. In 1972, he became the Head of the Chemical Laboratory at the Department of Forensic Medicine of the Medical Faculty of the J.E. Purkyně University, Brno. He has published 29 papers and holds 15 patents.

Associate Professor Ing. Stanislav Haderka, C.Sc. (1908, Mezice)

He graduated from the Faculty of Electrical Engineering of the Technical University in Brno in 1935 and in 1968 he was awarded the Degree of Candidate of Technical Sciences by the same University. He entered the Institute in 1966 and took up a study of permittivity detectors for liquid chromatography. He published 4 theoretical research papers in this field and holds 16 patents. He is the author of 4 books, 30 papers and 7 university textbooks. From 1972 to 1975 he lectured at the Technical University in Cairo, Egypt.

Miloš Janíček (1932, Brno)

He is the chief of a mechanical workshop, where, in addition to maintenance work, the various apparatus developed by the staff of the Institute is built. He is co-author of 4 papers and holds 3 patents.

Ing. Miloš Krejčí, C.Sc. (1931, Brno)

He is a senior research worker. Since 1956 he has been one of the key researchers at the Institute, and he heads the Department of Gas Analysis. In 1955, he was awarded the Degree of Chemical Engineer by the Technical University in Brno and in 1960 the Degree of Candidate of Chemical Sciences at the University of Chemical Technology in Prague. He was engaged in research work in the field of gas chromatography (gas analysis, structure of the supports of stationary phases). Since 1970 he has been engaged in research on liquid chromatography, especially detectors. In the above fields, he has published 55 papers and submitted 8 patents.

Ing. Josef Novák, C.Sc. (1932, Brno)

He entered the Institute in 1956. He is a senior research worker and heads the Department of Separation Methods. While working at the Institute he studied at the Department of Inorganic Chemistry at the University of Chemical Technology, Prague, which conferred upon him in 1963 the Degree of Chemical Engineer. In 1965 he was awarded the Degree of Candidate of Chemical Sciences by the same University. Novák's special interests are the thermodynamics of separation processes, theoretical aspects of analytical application of chromatography and quantitative trace analysis. He has written and contributed to 2 books and 69 papers and holds 16 patents.

Vlastimil Rezl, University Graduate (1931, Adamov)

He came to the Institute in 1964 and is now a senior research specialist, heading the working group for organic elemental analysis. He specializes in the application of the frontal chromatographic technique in organic elemental analysis. He graduated in 1953 from the Faculty of Science of Masaryk University (now the J.E. Purkyně University), Brno. He has written 15 papers and holds 8 patents. For his achievements he was awarded the Diploma of the Central Committee of the Communist Party of Czechoslovakia, the Government of the Czechoslovak Socialist Republic and the Central Council of the Czechoslovak Trade Unions in 1971 and the scientific prize of the Czechoslovak Academy of Sciences in 1975.

Radka Runštuková, University Graduate (1944, Brno)

She graduated in 1967 from the Faculty of Science of the J.E. Purkyně University, Brno, and since then has been working at the Institute. She heads the Department of Scientific, Technical and Economic Information, where she participated in developing a special system for processing the literature

Fig. 6. Staff of the Institute. Sitting from left to right: S. Haderka, M. Krejčí, J. Janák, J. Novák, R. Runštuková; standing from left to right: K. Tesařík, V. Rezl, M. Janíček, H. Dubský, M. Rusek, P. Boček, M. Dressler, S. Wičar.

on gas chromatography, on which the GC Bibliography Section of the Journal of Chromatography is based.

Miroslav Rusek (1929, Lesnica)

He graduated in 1947 from the Chemical Technical Secondary School in Brno. He entered the Institute in 1959 and specialized in gas analysis. He is now a senior specialist and is engaged in analytical methods for environmental protection. He has published 16 papers and holds 2 patents. During 1959—1960 and 1969—1972, he participated in the construction of the refinery at Homs (Syria) and set up and led there the chemical (mainly chromatographic) laboratory.

RNDr Karel Tesařík (1923, Brno)

He has been working at the Institute since 1957 and is a senior research specialist. During his early employment he also studied at the Faculty of Science of J.E. Purkyně University in Brno and graduated in 1959. He was awarded the Degree of Doctor of Natural Sciences by the same University in 1967. He is engaged in the study of the properties of capillary columns and lately has been developing methods for the laboratory preparation of micropackings for high-performance liquid chromatography. He heads a team working on capillary gas chromatography. He has published 65 papers and holds 14 patents.

Ing. Stanislav Wičar, C.Sc. (1932, Brno)

He entered the Institute in 1965. He is a senior research worker and now heads a working group for the automatic processing of analytical data. During his early employment he studied at the Faculty of Chemical Technology, Prague, where he graduated in 1963. He was awarded the Degree of Candidate of Chemical Sciences by the Scientific Board of Chemistry and Chemical Technique of the Czechoslovak Academy of Sciences, Prague, in 1970. He took up the study of chromatographic separation at high pressures. He has written 19 papers and holds 2 patents.

EMPLOYEES OF THE INSTITUTE

Present employees

Research workers

Boček, Petr	RNDr, C.Sc.	1969*
Dressler, Milan	RNDr, C.Sc.	1970*
Janák, Jaroslav	Assoc. Prof., Ing. D.Sc.	1956
Kouřilová, Danuše	RNDr, C.Sc.	1969*
Krejčí, Miloš	Ing., C.Sc.	1956
Novák, Josef	Ing., C.Sc.	1956
Slavík, Vladimír	Ing., C.Sc.	1972
Vejrosta, Jiří	Ing., C.Sc.	1976
Vespalec, Radim	Ing., C.Sc.	1972*
Wičar, Stanislav	Ing., C.Sc.	1969*

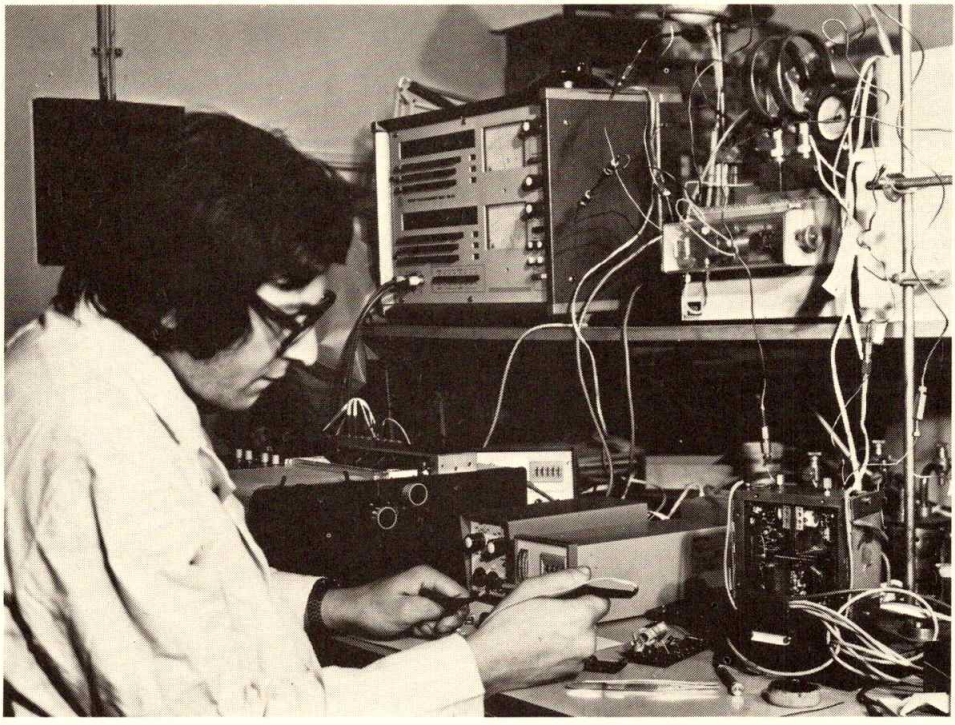

Fig. 7. Construction of the functional model of the permittivity detector. Modification of the electronic part of the detector. The detector provides a new solution (author Ing. V. Slavík) and is suggested for the study of the separation of compounds by liquid chromatography (Ing. J. Macharáček).

Specialists

Bilíková, Magdalena	Univ. Grad. Chem.	1974*
Deml, Mirko	Ing.	1962
Kaplanová, Božena	Ing.	1961
Macharáček, Jan	Ing.	1976*
Pajurek, Jan	Univ. Grad. Chem.	1975*
Rezl, Vlastimil	Univ. Grad. Chem.	1967*
Rinchenbach, Milan	JUDr	1964
Runštuková, Radka	Univ. Grad. Chem.	1967
Tesařík, Karel	RNDr	1957
Uhdeová, Jitka	Univ. Grad. Chem.	1969*

Technical workers and others

Čapková, Věra	1976
Janíček, Miloslav	1960
Juračková, Danuše	1966
Keprt, Ladislav	1965
Knappová, Marie	1976
Langrová, Věra	1963
Michalová, Jiřina	1975
Nečas, Miloslav	1966
Okřina, Milan	1973
Pellarová, Irena	1976
Petr, Josef	1975
Pličková, Zdeňka	1966
Roudná, Milena	1967
Rusek, Miroslav	1959
Smolová, Olga	1972
Tesaříková, Eva	1964
Zelinková, Věra	1975
Zrůstová, Marta	1963

Internal studies

Bártů, Vladimír	Ing.	1974
Bursa, Jiří	Univ. Grad. Chem.	1975
Drozd, Josef	Univ. Grad. Chem.	1973
Hrůzová, Jana	Ing.	1973
Pavelka, Stanislav	RNDr	1975
Ryšlavý, Zbyněk	Univ. Grad. Chem.	1974
Tomíček, Petr	Ing.	1974
Vrbová, Miroslava	RNDr	1973

Postgraduate

Šlais, Karel	RNDr	1974

*Former internal studies or postgraduates.

Fig. 8. Drawing of special glass capillary columns in the apparatus constructed in the Institute according to the design of Dr. K. Tesařík. The efficiency of columns reaches up to 7000 theoretical plates per metre (Dr. K. Tesařík, O. Smolová).

Former employees

Research workers and specialists

Čermák, Jan	Ing.	1966—1967
Dubský, Hanniel	RNDr, C.Sc.	1956—1972
Haderka, Stanislav	Assoc. Prof., Ing., C.Sc.	1966—1973
Hána, Karel	Ing.	1958—1972
Hřivnáč, Milan	Ing.	1958—1969
Růžičková, Jarmila	Univ. Grad. Chem.	1973—1974
Selucký, Milan	RNDr	1966—1969

Technical workers and others

Dokládalová, Věra		1964—1965
Fialová, Marie		1962—1965
Fric, Jan		1964—1975
Heimerlová, Dana		1969—1972
Hvězdová, Růžena		1963—1965
Jabůrková, Libuše		1964—1975
Jechová, Marta		1965—1975
Kepáková, Jitka		1965—1966
Konečná, Ludmila		1961—1969
Koukola, Vladimír		1966—1972
Kratochvílová, Věra		1975—1976
Mičanová, Marie		1965—1973
Spohr, Petr		1963—1964
Vévodová, Šárka		1971—1973
Vodičková, Julie		1964—1973
Vykypělová, Ludmila		1958—1964

Internal studies

Bilíková, Magdalena	Univ. Grad. Chem.	1970—1974
Borkovcová, Ivana	RNDr	1973—1975
Kaláb, Pavel	Univ. Grad. Chem.	1972—1975
Klimeš, Ivan	Ing., C.Sc.	1963—1966
Kouřilová, Danuše	RNDr, C.Sc.	1966—1969
Kubáň, Vlastimil	RNDr	1966—1969
Kubecová, Vlasta	Ing.	1967—1971
Martinů, Vlastimil	Univ. Grad. Chem.	1970—1973
Nečasová, Marie	Univ. Grad. Chem.	1970—1973
Novotný, Miloš	RNDr	1965—1968
Pajurek, Jan	Univ. Grad. Chem.	1969—1972
Palas, Ivan	Univ. Grad. Chem.	1970—1971
Pásek, Jan	Ing.	1970—1971
Pospíšilová, Naděžda	Univ. Grad. Chem.	1969—1972

Rezl, Vlastimil	Univ. Grad. Chem.	1964—1967
Růžičková, Jarmila	Univ. Grad. Chem.	1970—1973
Samková, Helena	Univ. Grad. Chem.	1970—1973
Selucký, Milan	RNDr	1965—1966
Stejskal, Vítězslav	Univ. Grad. Chem.	1971—1972
Šklíbová, Ilona	Ing., C.Sc.	1968—1970
Uhdeová, Jitka	Univ. Grad. Chem.	1966—1969
Vespalec, Radim	Ing., C.Sc.	1969—1972
Wičar, Stanislav	Ing., C.Sc.	1965—1969

Postgraduates

Boček, Petr	RNDr	1966—1969
Dressler, Milan	RNDr	1964—1969
Keslar, Miroslav	Ing.	1965—1968
Pajurek, Jan	Univ. Grad. Chem.	1972—1975
Potočková, Alena	RNDr	1969—1974

External postgraduate

Svojanovský, Vladimír	Ing.	1964—1967

LONG-TERM SCIENTIFIC STAYS IN THE INSTITUTE

Bulgaria	
Dodova, M.A.	Department of Organic Chemistry, Bulgarian Academy of Sciences, Sofia
Kotsev, N.	Institute of Organic Chemistry, Sofia
Lekova, K.	Research and Development Institute of Chemical Industry, Sofia
Rakshieva, N.R.	Department of Analytical Chemistry, Technical University, Sofia
China	
Tang, S.J.	Institute of Petroleum Research, Chinese Academy of Sciences, Dairen
Czechoslovakia	
Bečka, Jan	Agricultural University, Jihlava
Chundela, Bedřich	Institute for Toxicology and Forensic Chemistry, Faculty of General Medicine, Charles' University, Prague
Cinertová, Drahomíra	Institute of Macromolecular Chemistry, Czechoslovak Academy of Sciences, Prague
Dáňová, Naděžda	Institute of Physical Metallurgy, Czechoslovak Academy of Sciences, Brno
Dobiášová, Milada	Institute of Organic Chemistry and Biochemistry, Czechoslovak Academy of Sciences, Prague
Goliáš, Jan	Agricultural University, Lednice
Hobzová, Jana	Institute of Care for Mother and Child, Prague
Hoch, Karel	Faculty of Science, Charles' University, Prague
Holík, Miroslav	Lachema, N.E., Brno
Kalina, Jan	University of Chemical Technology, Prague
Knoflíčková, Hana	Research Institute of Feedstuffs, Pohořelice
Kolarczyková, Jarmila	Research Institute of Metallurgy and Iron, Ostrava
Komárek, Karel	University of Chemical Technology, Pardubice
Komers, Radko	Institute of Chemical Process Fundamentals, Czechoslovak Academy of Sciences, Prague
Kubásek, František	Research Institute of Animal Production, Uhříněves, near Prague
Lazarev, Anatol	Chepos, N.E., Research Institute of Chemical Equipment, Brno
Lukáč, Sáva	Nuclear Research Institute, Řež, near Prague
Ondrejička, Miroslav	Pedagogical Institute, Nitra

Pospíchal, Otakar	Research Institute of Pure Chemicals, Lachema, N.E., Brno
Řehák, Vladimír	Department of Analytical Chemistry, Faculty of Science, Charles' University, Prague
Rittich, Bohuslav	Research Institute for Animal Nutrition, Pohořelice
Sedlák, Dušan	Duslo, N.E., Šal'a
Škrabánek, Petr	Department of Forensic Medicine, Faculty of Medicine, J.E. Purkyně University, Brno
Standara, Stanislav	Veterinary University, Biological Institute, Brno
Steklá, Jiřina	Research Institute of Fat Industry, Prague
Tomášková, Věra	Pharmaceutical Faculty, Komenský University, Bratislava
Úlehla, Jiří	Research Institute of Plant Production, Czechoslovak Academy of Agriculture, Pohořelice
Vašák, Vladimír	Institute of Workers' Hygiene and Professional Diseases, Prague
Vojtovič, Květoslav	Department of Coking Industry and Gas Manufacture, University of Chemical Technology, Prague
Zelinka, Ladislav	Research Institute of Water Economy, Prague
East Pakistan	
Rabbani, G.	Government College, Sylhet, East Pakistan
German Democratic Republic	
Gnauck, G.	Technische Gase-Werke, Oberschöneweide, Berlin
Rusche, J.	Institut für Organische Chemie, Berlin-Adlershof
Schöntube, E.	Anästhesie-Abteilung, Chirurgische Universitätsklinik Charité, Berlin
Struppe, H.G.	Deutsche Akademie der Wissenschaften, Leipzig
Hungary	
Kecskès, L.	Control Research Laboratory, Medical University of Pécs, Pécs
Sera, J.	Research Institute of Organic Chemistry, Budapest
Szabadka, O.	University of Chemistry, Veszprém
Zöllner, G.	Research Institute of Organic Chemistry, Budapest

India

Agrawal, B.B.	Indian Institute of Petroleum, Dehradun
Bhatnagar, V.M.	University of Perth, Australia
Dogra, P.V.	University of Delhi, New Delhi
Guha, O.K.	Central Fuel Research Institute, P.O.F.R.I., Dhanbad
Moolchandra, R.	Indian Institute of Petroleum, Dehradun
Mushran, S.P.	Department of Chemistry, University of Allahabad, Allahabad
Nigam, R.N.	Indian Institute of Petroleum, Dehradun
Pansare, V.S.	National Chemical Laboratory, Poona
Saikia, B.K.	Regional Research Laboratory, Jorhat-6, Assam
Singh, H.B.	University of Delhi, New Delhi

The Netherlands

Van Rijswick, M.H.J.	Technical University, Eindhoven

Poland

Borys, A.	Institute of Fermentation Industry, Warsaw
Bylina, A.	Institute of Physical Chemistry, Polish Academy of Sciences, Warsaw
Czajkowska, T.	Chemical Institute, M. Curie-Skłodowska University, Lublin
Miedziak, I.	Chemical Institute, M. Curie-Skłodowska University, Lublin
Staszewski, R.	Institute of Chemical Engineering and Measuring Technique, Technical University, Gdanks
Wojdała, T.	Central Rafinery and Petrochemical Works, Plock

Romania

Farkaçiu, M.	Research Institute of Chemistry, Academy of RSR, Bucharest

U.S.S.R.

Berezkin, V.G.	A.V. Topchiev Institute of Petrochemical Synthesis, Academy of Sciences of the U.S.S.R., Moscow
Bulenkova, L.F.	Institute of Organic Chemistry, Academy of Sciences of the Lithuanian Soviet Socialist Republic, Riga
Gavrilova, T.B.	Department of Adsorption and Gas Chromatography, Lomonosov State University, Moscow

Klesment, I.	Chemical Institute of the Academy of Sciences of the Estonian Soviet Socialist Republic, Tallinn
Rang, S.	Chemical Institute of the Academy of Sciences of the Estonian Soviet Socialist Republic, Tallinn
Svjatošenko, A.T.	A.V. Topchiev Institute of Petrochemical Synthesis, Academy of Sciences of the U.S.S.R., Moscow

Vietnamese Democratic Republic

Suu, D.T.	Department of Analytical Chemistry, Pharmaceutical College, Hanoi
Tac, N.C.	Bureau of Workers' Hygiene of the Institute of Hygiene and Epidemiology of Hanoi, Hanoi

Yugoslavia

Aličevski, K.	OCHIS, Skopje
Brkić, A.	Enterprise "Jedinstvo", Zagreb
Ghyczy, S.	PLIVA, Zagreb
Jagarić, Z.	OKI, Zagreb
Petrović, K.	NAFTAGAS, Novi Sad
Petrović, P.	Institute for Technology, Novi Sad
Sarapa, M.	INA - NAFTAPLIN, Zagreb
Širec, M.	KRKA - ZDRAVIL, Novo Mesto
Vernik, J.	LEK, Ljubljana

THESES

Boček, P.: Study of the pressure effects on flame-ionization detection. 105 pp. Ph.D. Thesis. Faculty of Science, J.E. Purkyně University, Brno, 1969 (in Czech).

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Haderka, S.: Collection of works on electronic measurements with particular consideration of resonance method of measurements. Ph.D. Thesis. Electrotechnical Faculty, Technical University, Brno, 1967 (in Czech).

Hřivnáč, M.: Gas chromatography of coal tar raw materials. 97 pp. Ph.D. Thesis. Faculty of Technology of Fuels and Water, Technical University, Prague, 1964 (in Czech).

Janák, J.: Chromatographic analysis of gases. 136 pp. D.Sc. Thesis. Faculty of Chemical Technology, Technical University, Prague, 1964 (in Czech).

Justová-Kubecová, V.: Chromatographic behaviour of aliphatic C_1—C_4 amides on organic porous copolymers of the Porapak type. 104 pp. Ph.D. Thesis. Institute of Analytical Chemistry, Czechoslovak Academy of Sciences, Brno, 1975 (in Czech).

Kouřilová, D.: The determination of specific surface areas of flat materials by the dynamic desorption method. 83 pp. Ph.D. Thesis. Institute of Analytical Chemistry, Czechoslovak Academy of Sciences, Brno, 1971 (in Czech).

Krejčí, M.: Chromatographic analysis of noble gases. 61 pp. Ph.D. Thesis. Faculty of Chemical Technology, Technical University, Prague,1960 (in Czech).

Krupčík, J.: Separation and characterization of some homologues of organic acids by gas chromatography. Carboxylic acids isolated from the products of biochemical oxidation of *n*-alkanes. 133 pp. Ph.D. Thesis. Faculty of Chemical Technology, Slovak Technical University, Bratislava, 1972 (in Czech).

Novák, J.: Contribution to the problem of quantitative analysis by means of gas chromatography. Roles of heat transport and quantity of molecule motion as the detection principles in gas chromatography. 121 pp. Ph.D. Thesis. Faculty of Chemical Technology, Technical University, Prague, 1965 (in Czech).

Tac, Nguyen Xuan: The use of gas chromatographic methods for the determination of elements and functional groups in organic compounds. 59 pp. Ph.D. Thesis. Institute of Analytical Chemistry, Czechoslovak Academy of Sciences, Brno, 1971.

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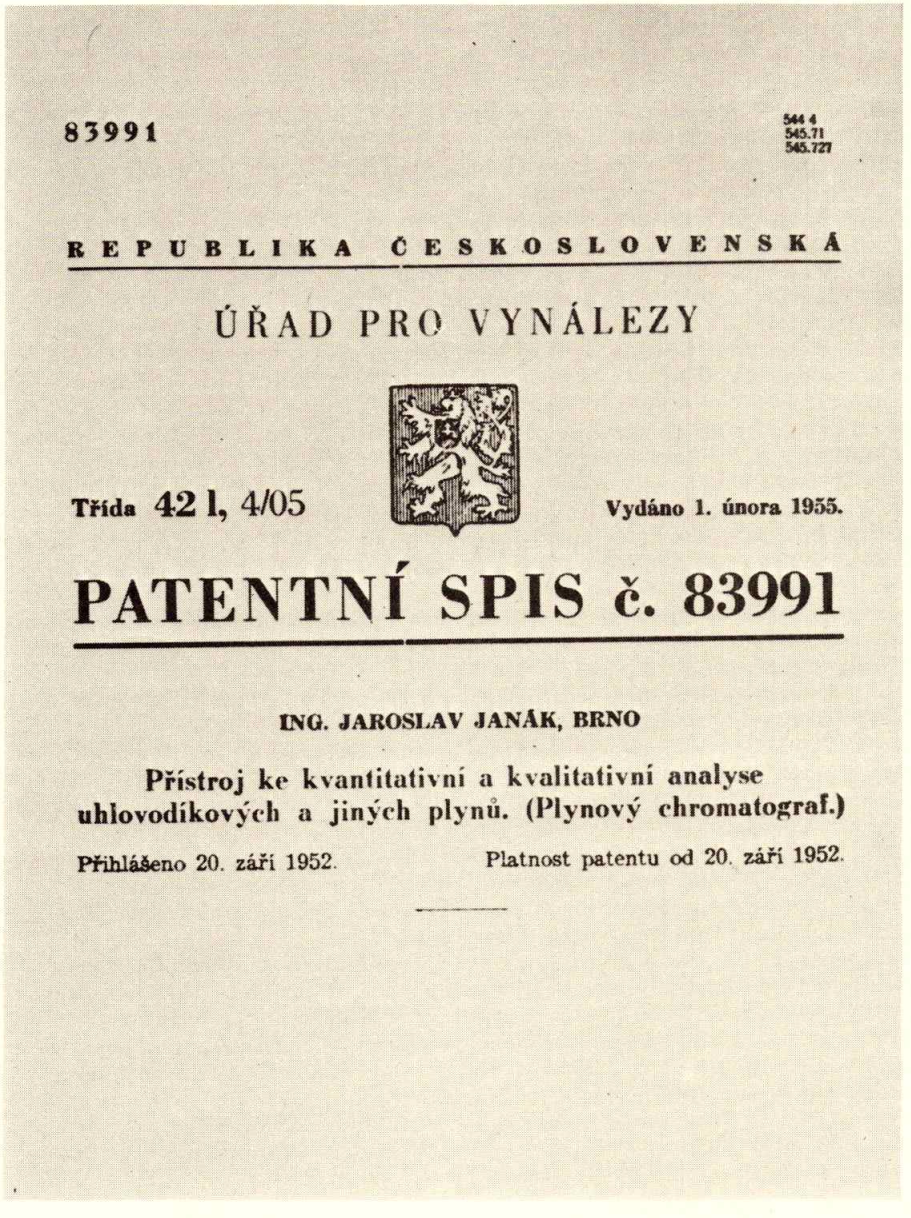

83991

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REPUBLIKA ČESKOSLOVENSKÁ

ÚŘAD PRO VYNÁLEZY

Třída 42 l, 4/05

Vydáno 1. února 1955.

PATENTNÍ SPIS č. 83991

ING. JAROSLAV JANÁK, BRNO

Přístroj ke kvantitativní a kvalitativní analyse uhlovodíkových a jiných plynů. (Plynový chromatograf.)

Přihlášeno 20. září 1952. Platnost patentu od 20. září 1952.

Fig. 9. Czechoslovak Patent No. 83991 by Dr. Janák "Apparatus for Quantitative and Qualitative Analysis of Hydrocarbons and other Gases. (Gas Chromatograph)", valid from 20th September, 1952. It was the first patent in the world devoted to a gas chromatograph. The method accelerated the world development of classical gas analysis into a modern tool, the origin of the Laboratory of the Czechoslovak Academy of Sciences and the manufacture of entirely new instrumentation in Czechoslovakia. The work was awarded the Czechoslovak State Prize in 1954. (a) Patent; (b) instrument (I. Pelázková).

PATENTS

Czech Patents

83.991 — Janák, J.: Instrument for the quantitative and qualitative analyses of hydrocarbon and other gases.
93.286 — Dubský, H.: Method for the quantitative evaluation of the composition of substances in gas chromatographic analysis.
100.868 — Dubský, H.: Method for sampling of solid or liquid substances in gas chromatographic analysis.
102.812 — Janák, J., Tesařík, K. and Hána, K.: Instrument for the determination of the particles dispersed in gases, particularly in the atmosphere.
108.020 — Novák, J. and Hřivnáč, M.: Method for the separation of pure aromatic hydrocarbons, heterocyclic compounds, phenols and bases from their technical mixtures.
108.998 — Hána, K., Pietsch, K. and Čermák, R.: Method and device for the automatic process control and evaluation of chemical analyses.
110.034 — Nalezený, E. and Dubský, H.: Capillary column for gas chromatography.
110.249 — Dubský, H.: Method for the isolation of metals and other elements from mixtures.
111.017 — Rusek, M.: Sampling device for the gas chromatographic analysis of gases.
114.605 — Novák, J. and Janák, J.: Pneumatic detector for chromatographic fractions.
117.952 — Krejčí, M. and Hána, K.: Analyzer for volatile substances with a thermally programmed catalyst.

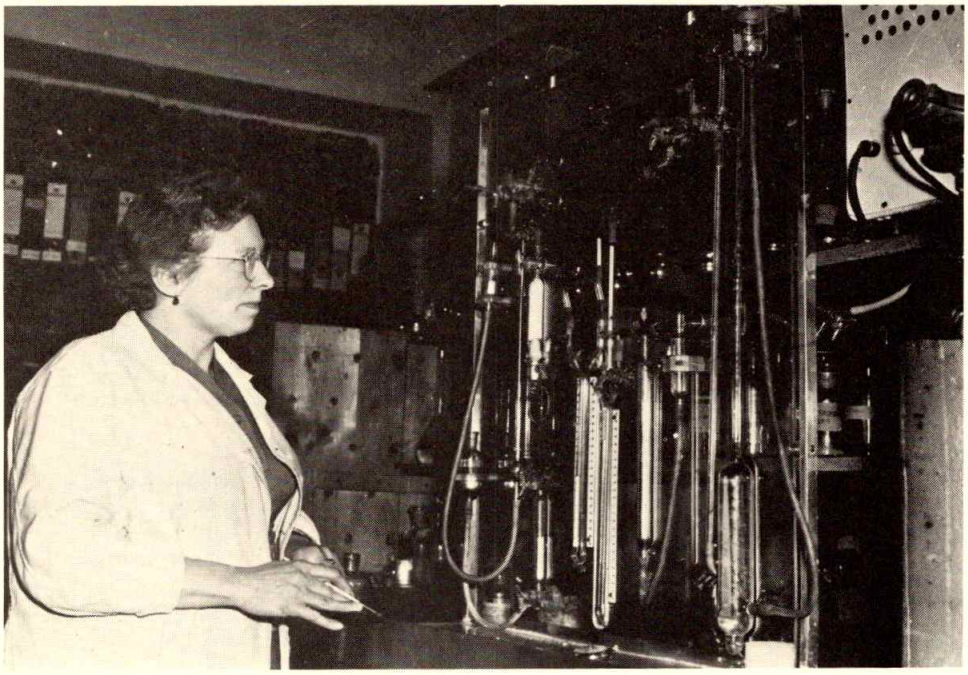

Fig. 9b.

122.737 — Dostál, J. and Wičar, S.: Device for continuous crystallization in a circulating suspension that is evaporated by air adiabatically.
126.801 — Dubský, H.: Liquid integrator for gas chromatography.
127.638 — Dubský, H.: Liquid integrator for gas chromatography.
127.761 — Tesařík, K., Deml, M. and Janíček, M.: Device for automatic regulation of the gas in a mixture of gases in closed systems.
127.939 — Dubský, H.: Procedure for the determination of the height equivalent to a theoretical plate of a chromatographic column and a device for its effectuation.
130.012 — Chundela, B. and Novák, J.: Device for defined trapping of admixtures in expired air and their quantitative introduction into a gas chromatograph.
131.047 — Deml, M., Tesařík, K. and Janíček, M.: Cooling device for substances, particularly biological samples, with a defined temperature drop.
131.868 — Tesařík, K. and Kocur, M.: Device for the lyophilization of microorganisms.
134.924 — Janák, J. and Klimeš, I.: Cuvette for spectrophotometry.
135.679 — Haderka, S., Janák, J. and Novák, J.: Column with controlled heating.
139.019 — Haderka, S. and Deml, M.: Device for the adjustment of a temperature gradient.
139.947 — Tesařík, K.: Procedure for the modification of the internal surface of a glass capillary.
140.194 — Haderka, S., Janák, J. and Novák, J.: Chromatographic column with controlled heating.
140.284 — Rezl, V.: Device for the elemental analysis of organic substances.
140.342 — Rezl, V.: Procedure for the elemental analysis of organic substances.
145.122 — Dubský, H.: Ionization detector.
145.710 — Dressler, M. and Deml, M.: Connection for suppression of the noise from a chromatographic detector in an electrical circuit.
147.229 — Haderka, S. and Hána, K.: Method and device for detection in liquid chromatography.

Authors' Certificates

149.796 — Novák, J. and Dressler, M.: Method for the construction of a burner jet tip for detection with an alkali flame-ionization detector.
150.104 — Dubský, H.: Device for mass transfer in chromatographic detection.
151.193 — Rezl, V., Novák, J. and Hřivnáč, M.: Method for the separation of azeotropic mixtures of substances with similar boiling points from picoline fractions.
151.737 — Haderka, S.: Method and device for selective detection in liquid chromatography.
152.131 — Deml, M., Janíček, M. and Tesařík, K.: Device for instantaneous collection of samples for analysis.
152.192 — Vespalec, R. and Krejčí, M.: Method for degassing of the passage lines of a liquid chromatograph.
153.676 — Haderka, S.: Device for measuring the conductance component of admittance by the resonance method.
153.677 — Haderka, S.: Device for detection in liquid chromatography.
153.678 — Krejčí, M. and Tesařík, K.: Chromatographic analyzer for exhaust gases.
154.037 — Deml, M., Tesařík, K. and Krejčí, M.: Device for the liquid chromatograph suppressing pressure pulses of the mobile phase.
154.075 — Haderka, S.: Method and connection for detection in liquid chromatography.
154.807 — Dubský, H.: Detector for chromatographic analysis.
155.622 — Čermák, J. and Deml, M.: Method for measurement of water transport in timber species, particularly in adult trees.
157.857 — Rezl, V.: Device for analysis of gaseous mixtures by frontal gas chromatography.

159.406 — Dufka, O., Malinský, J., Kacafírek, S. and Janák, J.: Planary sorption material.
161.376 — Vejrosta, J., Wichterle, I. and Wičar, S.: Device for the measurement of the liquid—vapour equilibrium at high temperatures.
161.433 — Tesařík, K. and Kaláb, P.: Device for the detection of the changes in ion concentrations in ionogenic solutions.
161.472 — Slavík, V.: Device for measuring the difference in power outputs.
161.613 — Novák, J., Gelbičová-Růžičková, J. and Wičar, S.: Method and device for the collection of small amounts of substances kept under pressure in a closed container.
167.052 — Krejčí, M. and Tesařík, K.: Detection device for liquid chromatography.

Non-Czech Patents

Dubský, H.: Detector for chromatographic analysis. U.S. 3,850,579.
Dubský, H.: Device for mass transfer in chromatographic detection. U.S. 3,744,973; British 1,323,840; Italian 933,886.
Haderka, S.: Method and device for selective detection in liquid chromatography. Belgian 777,295; French 71/46,708; British 1,356,064; Italian 965,583.
Haderka, S., Janák, J. and Novák, J.: Chromatographic column with controlled heating. British 1,178,226; Egyptian 8870; German Democratic Republic 68,774; Indian 116,983.
Hána, K., Pietsch, K. and Čermák, R.: Method and device for automatic process control and evaluation of chemical analyses. U.S. 3,306,096.
Novák, J. and Janák, J.: Pneumatic detector for chromatographic fractions. British 1,046,162; Canadian 731,893; French 1,384,328; German Federal Republic 1,214,025.
Tesařík, K.: Procedure for the modification of the internal surface of the glass capillary. Swedish 338,646.

Czech Patent Applications

PV 5797-74 — Deml, M., Boček, P. and Janák, J.: Isotachophoretic column.
PV 6965-74 — Rezl, V. and Wičarová, O.: Coupling of two gas chromatographs for simultaneous analysis by elution and frontal techniques.
PV 7116-74 — Deml, M., Boček, P. and Janák, J.: Detection device for an isotachophoretic column.
PV 7848-74 — Rezl, V. and Uhdeová, J.: Method for the analysis of organic compounds or gases and a device for its effectuation.
PV 8292-74 — Rezl, V. and Uhdeová, J.: Method for the analysis of organic compounds or gases and a device for its effectuation.
PV 538-75 — Kaláb, P. and Tesařík, K.: Method for formation of a porous surface on glass beads.
PV 3063-75 — Kaláb, P. and Tesařík, K.: Method for preparation of glass beads with porous layers of metal oxides.
PV 966-75 — Tesařík, K., Krejčí, M. and Rusek, M.: Device for the purification of exhaust gases from internal combustion and spark-ignition engines.
PV 8103-75 — Krejčí, M. and Šlais, K.: Method and device for measuring concentrations of the components of a streaming liquid.
PV 8549-75 — Slavík, V.: Connection for detection in liquid or gel permeation chromatography using the principle of comparing signals from two oscillators.

COLLECTIVE HONOURS, PERSONAL PRIZES AND AWARDS

Collective state honours

Award of the President of the Czechoslovak Socialist Republic to the Institute of Instrumental Analytical Chemistry of the Czechoslovak Academy of Sciences "Endeavour in Creative Activity" for outstanding achievements in their work (Prague, April 1966).

"Public Appreciation" of the Czechoslovak Academy of Sciences and the Central Committee of the Trade Union of Employees in Education and Culture to the Laboratory for Gas Analysis of the Czechoslovak Academy of Sciences for the successful realization of new forms of scientific cooperation in fundamental and applied research and for the introduction of the results into practice (Prague, September 1965).

Prizes of the Czechoslovak Academy of Sciences

1962
Janák, J., Hána, K., Tesařík, K., Pietsch, K. and Čermák, R.: Automatic industrial monitor based on gas chromatography.

1975
Rezl, V. and Janák, J.: Methods and instrumentation for elemental analysis (C, H, N).

Prize of the Secretary General of the Czechoslovak Academy of Sciences and the Secretary General of the Slovak Academy of Sciences in the Competition of High-Quality Instruments

1975
Deml, M., Boček, P. and Janák, J.: Analytical isotachopherograph for rapid separations.

Awards of the Scientific Board for Chemistry and Chemical Technology

1964
Novák, J., Vašák, V. and Janák, J.: Chromatographic method of concentration of trace elements in gases.

1968
Krejčí, M., Tesařík, K. and Rusek, M.: Surface phenomena in chromatography. A study of the behaviour of a thin layer of liquid on a chromatographic support.

1969
Boček, P., Novák, J. and Janák, J.: Statistical analysis of quantitative gas chromatographic techniques.
Novák, J.: Quantitative analysis by gas chromatography.

1970
Novák, J. and Wičar, S.: A collection of papers on the function of pressure in mass transfer between the heterogeneous gas—liquid phase.
Rezl, V.: Elemental C, H, N analysis by means of gas chromatography.

Fig. 10. Functional tests of a CHN-1 elemental analyzer. The instrument, for which Czechoslovakia gained the agreement on specialization within COMECON countries, is manufactured by Laboratory Instruments, N.E., Prague, according to the patent of the staff member Vlastimil Rezl. The instrument was awarded the diploma of the international exhibition INTERLAB in Ostrava in 1971, the Golden Medal at the International Engineering Trade Fair in Brno in 1973 and the prize of the Czechoslovak Academy of Sciences in 1975 (J. Drozd).

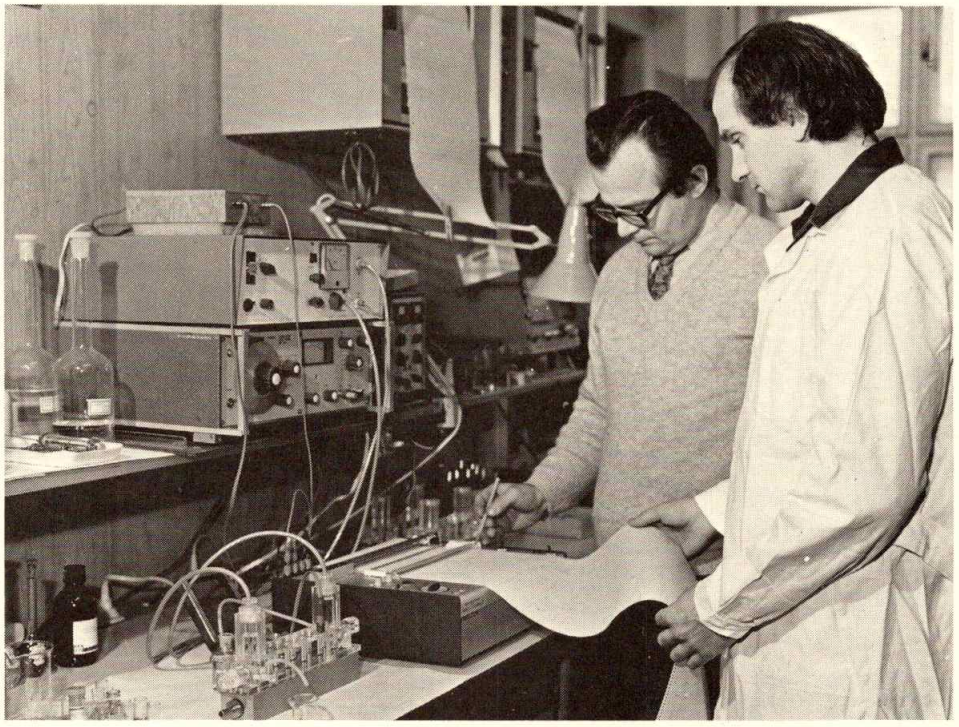

Fig. 11. Testing of the functional model of the isotachopherograph designed and built in the Institute. The instrument was awarded the 3rd prize in the competition for instruments designed in the Czechoslovak and Slovak Academy of Sciences in 1975. (Two of the authors: Ing. M. Deml on the left and Dr. P. Boček on the right.)

1971

Krejčí, M. and Kouřilová, D.: Chromatographic determination of small specific surface areas of flat materials in large volumes of gas by the method of dynamic desorption.
Tesařík, K.: Methods for the preparation of high-efficiency glass capillaries by etching in the gas phase.

1972

Dubský, H.: Elaboration of new detection methods for high-efficiency liquid chromatography with utilization of transport of the mobile phase.
Novák, J., Wičar, S. and Gelbičová-Růžičková, J.: Explanation of the role of non-idealities in a chromatographic process and in detection in gas chromatography.

1973

Novák, J., Růžičková, J. and Wičar, S.: Introduction of a general criterion of polarity of the stationary phase and generalization of the system of retention indices in gas chromatography.
Tesařík, K. and Prachařová-Nečasová, M.: Explanation of the roles of viscosity in surface tension and of temperature in the formation of layers in the stationary phase in high-efficiency capillary columns.

1975

Wičar, S. and Novák, J.: Specific elution volume in high-pressure elution chromatography.

PUBLICATIONS OF A MONOGRAPH CHARACTER

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Berezkin, V.G., Soják, L. and Uhdeová, J.: Use of chemical methods for the preparation of standard mixtures for qualitative analysis by gas chromatography. *J. Chromatogr.*, 98 (1974) 157—170.

Boček, P. and Janák, J.: Flame-ionization detection. *Chromatogr. Rev.*, 15 (1971) 111—150.

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Janák, J.: Chromatographic analysis of gases. In K.V. Chmutov and K.I. Sakodynskii (Eds.), *Advances in Chromatography*, Nauka, Moscow, 1972, pp. 268—293 (in Russian).

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Janák, J.: GC—TLC: Two-dimensional chromatography using gas chromatography as one dimension. In A. Niederwieser and G. Pataki (Eds.), *Progress in Thin-Layer Chromatography and Related Methods*, Vol. II, Ann Arbor Sci. Publ., Ann Arbor, 1971, pp. 63—91.

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SCIENTIFIC AND OTHER PUBLICATIONS

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Janák, J. and Rusek, M.: Chromatographic semimicro analysis of gases. V. Analysis of unsaturated C_2 and C_3 hydrocarbons. *Chem. Listy*, 47 (1953) 1190—1196 (in Czech).

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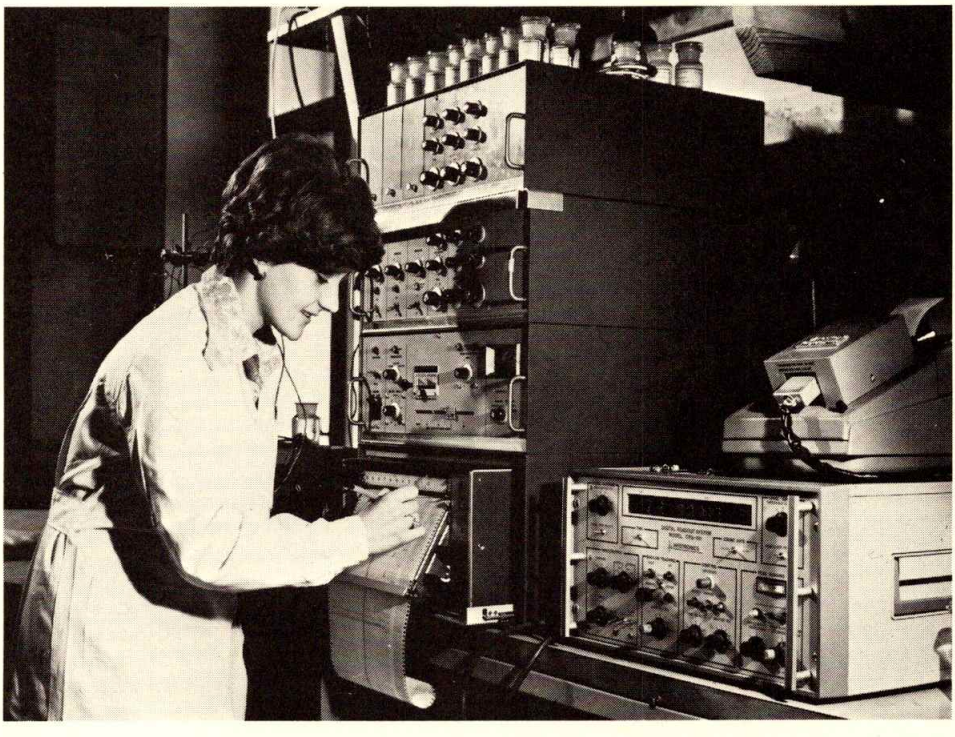

Fig. 12. Determination of trace amounts of atmospheric pollutants by gas chromatography using the method of frontal chromatographic concentration. Evaluation of the chromatogram — quantitative determination by means of an electronic digital integrator (M. Roudná).

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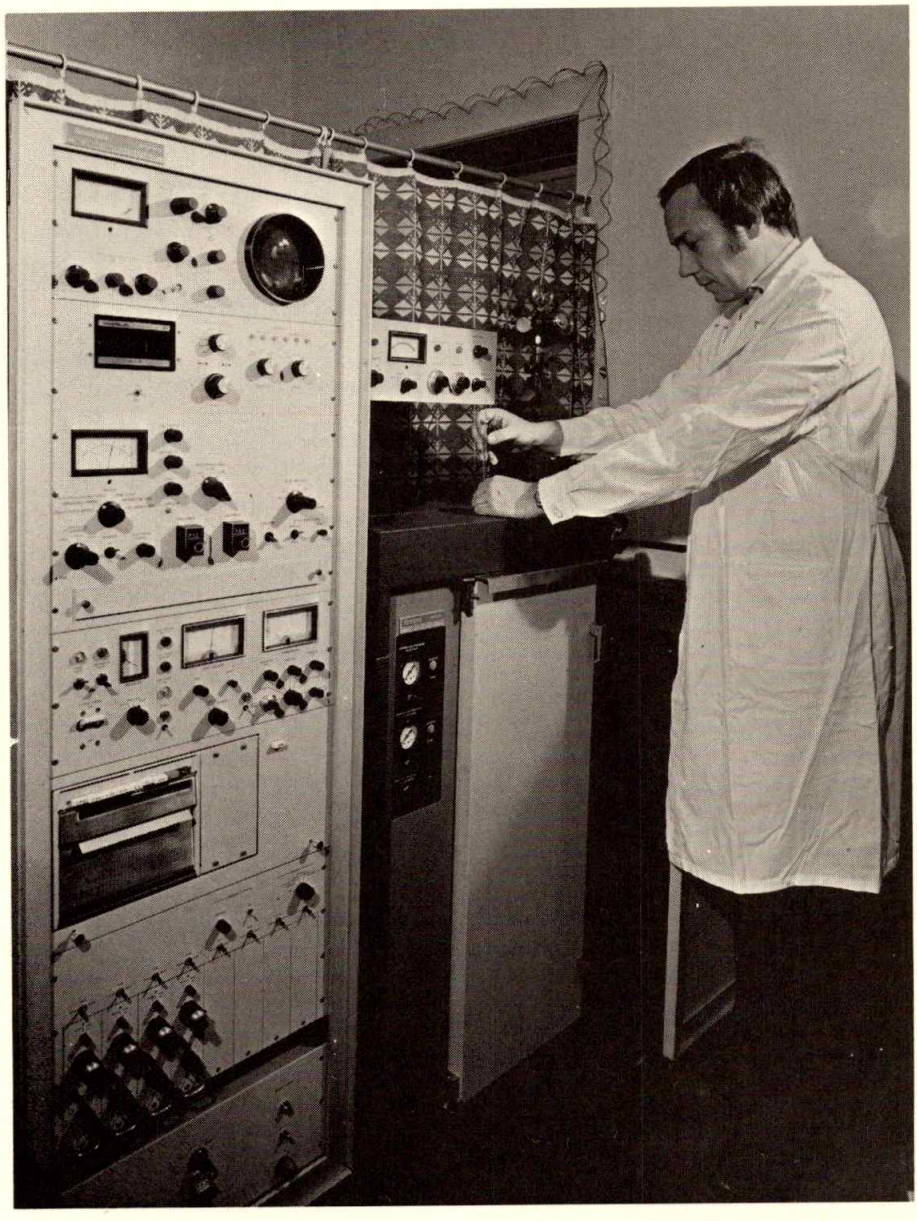

Fig. 13. Injection of the sample under analysis into a gas chromatograph combined with a mass spectrometer. The instrument permits the analysis of very complicated mixtures and reliable identification of their components (L. Keprt).

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Fig. 14. Automatic processing of chromatograms in a JPR 12 minicomputer. The instrument serves as a control element for an automatic petrochemical laboratory (Ing. O. Bártů).

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The staff of the Institute also contribute to the popularization of science. They cooperate with journals of a popular scientific character, such as Vesmír (Space) and Věda a život (Science and Life).

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