

# **A HISTORICAL OVERVIEW OF THE DEVELOPMENT OF THE ACTUARIAL PROFESSION IN BULGARIA**

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## **Summary**

An overview of the historical development of the actuarial profession in Bulgaria is presented. First, the foundation of the insurance business and its impact on the emerging of the actuarial profession is described. The names of some of the first actuaries, are mentioned and the number of members of the profession is traced over the years. The fields of actuarial work and expertise are listed, among which, life insurance, agricultural risk and fire insurance, health and accident insurance, actuarial valuation of pension schemes, development of life tables, calculation of reinsurance premiums etc. The foundation of the professional body of actuaries in Bulgaria is followed since 1924, when the Society of Bulgarian Actuaries was first established. The re-establishment of the organization in 1993, under the name Bulgarian Actuarial Society, is emphasized as a second important event in its history. The development of the actuarial education in Bulgaria and the role of actuarial knowledge, coming from foreign countries is enlightened shortly. The importance of some of the education centers, among which the colleges in trade and finance in the towns of Russe and Svishtov at early times and “Kliment Ohridsky” University in Sofia and the Economics Universities in Sofia and Svishtov on later stages is noted. The importance of the Post Graduate Diploma Course in Actuarial Sciences organized recently by the Bulgarian Actuarial Society and the Institute and the Faculty of Actuaries in Britain for the education of Bulgarian actuaries is also emphasized. The role of the actuaries, as regulated by the national insurance and social security legislation, is further described. Special attention is paid to the role of the actuaries in the Government supervision of the insurance business and the social security system. Some contributions of Bulgarian actuaries to the development of the actuarial science are shortly indicated. The relations to and the influences from some of the European actuarial schools, such as the German, French and the British schools are followed. An extensive overview of the major actuarial publications in Bulgaria is also presented. The importance of both the early actuarial articles and books of Ivan Giuzelev, dated 1906 and 1911, and the later textbooks of Dimitar Kolev of 1925 and of Prof. Ivan Katzarov of 1938 and 1954, along with other recent actuarial publications is especially emphasized. Finally, a list of relevant bibliography, including 37 titles of papers, books, documents and other written materials is given.

## **1. Foundation of the insurance business and the actuarial profession in Bulgaria.**

The development of the actuarial profession in Bulgaria was naturally connected with the process of establishment of the insurance business and practice in the country. Evidence of the first mutual assurance societies against agricultural risks (fire, hails, floods etc.) in the Bulgarian countryside can be traced back to 1850, as the French traveler Ipolit Depret reports. All together, there have been 12 foreign and four Bulgarian insurance companies, operating in Bulgaria at the end of the 19-th the beginning of the 20-th Century. Among them, it is worthwhile mentioning the Romanian companies “Dachia-Romania”, established in 1882 and “National” - in 1889, the USA mutual insurance company “New York”, established in 1887 and the Austrian insurance company “Anker” in 1890. The first Bulgarian insurance company, named “Bulgaria” was found in 1893 in the town of Russe. “Bulgaria” insured against fire and offered life insurance as well. The second Bulgarian insurance company was the “National assurance society Balkan”, established in 1895 in Sofia by taking over the business from the two Romanian companies “National” and “Dachia-Romania”. “Balkan” insured the major, state owned buildings in the capital of Sofia, offered accident and life insurance as well. It was also the first Bulgarian reinsurance company, which had an international recognition. “Balkan” paid out \$200 000 as reinsurance liabilities to cover damages, caused by the earthquake in San Francisco in 1906. “Balkan” was also the first company to establish a private pension Fund for office workers and clerks in Bulgaria. Two other mutual assurance companies, named “Teacher’s fund” and “Cooperative savings and insurance society of office workers” were found, correspondingly in 1903 and 1905.

Needs for some simple actuarial calculations have emerged with the foundation of the first Bulgarian insurance companies, named “assurance societies” already at the end of the 19-th the beginning of the 20-th century. At the beginning, actuaries in Bulgaria, as perhaps in other countries, have been quite universal and have dealt with life, non-life insurance and pensions. The first Bulgarian actuaries were engaged in the few insurance companies, mentioned above. An actuary meant “an insurance mathematician” and in some written sources from that time we found the definition of an actuary as a “technical person who performs the calculation of the tariffs and the reserves of the insurance company”. Among the first names of actuaries we can mention the following names, quoted in the book of Georgi Nikolov (1926) “Labour and Industry” v. II “The Insurance Business in Bulgaria” and some other source (see 2, 4, 5, 17 and 18 of the list of bibliography): Ivan Giuzelev who was a mathematician and a member of the board of directors of the mutual insurance company, named “Cooperative saving and insurance society of office workers” since its establishment in 1905; Kiril G. Popov who was in 1903 the Director of the Government Statistical Office and was a member of the executive board of the “Cooperative saving and insurance society of office workers” insurance company; Dr. T. Dedov who started as an actuary in the “Teacher’s Fund” in 1903 and passed

in 1922 to the insurance company “America”; St. Petkov who was, according to the written evidence, an actuary in “Balkan-Life” insurance company in 1924 and Michael Michailovski an actuary in “Orel” insurance company since 1925 and a member of the Society of Bulgarian Actuaries found in 1924. We ought to mention also the names of Bonju Bonev, an actuary and a Director in “Balkan-Life” insurance company, Ivan Koiumdjiev and Christo Petrov, who were involved as actuaries since the very beginning of the foundation of the industry. It has to be noted also, that some foreigners were invited at the end of the century to assist in founding and developing the Bulgarian insurance industry. We can mention the names of Mr Fr. Novak from Prague, who arrived in 1893 in Bulgaria and became the first director in chief of the first Bulgarian insurance company “Bulgaria”. Being an experienced banker and expert in finances he was the first to sign a reinsurance contract for “Bulgaria”, directly addressing the actuarial problems of defining the reinsurance premium. Considerable assistance in the foundation of the Bulgarian insurance industry, including the actuarial field, was received from some experts from the German reinsurance company Munich Re. Another important name to be mentioned is the name of Mr Georgi Teodorov, who was a deputy Director of “Bulgaria” insurance company since its foundation in 1993 and three years later inherited the Chair of the Director in Chief of the company from F. Novak. Both F. Novak and G. Teodorov ought to be given credit for the development of the tariffs for the insurance policy against “Fire”. They were also the initiators of the creation of the first table of premiums for real estate and other property insurance policies (see the book : “Fifty years of insurance company Bulgaria - first Bulgarian Insurance Society 1891 - 1941”, n 18 in the list of bibliography).

## **2. Fields of actuarial work and expertise.**

From the very beginning of their actuarial practice, starting from the end of the 19-th century, Bulgarian Actuaries have dealt with life insurance, pensions and general insurance. In the latter field actuaries have been involved in developing certain insurance policies, covering the risk of fire, transportation risks in trading and agricultural risks, i.e. insurance cover of the grain fields against hail, insurance of domestic animals etc. This was a very substantial part of the insurance practice in Bulgaria, because of the extreme importance of the agriculture for the economy at that time. Another branch of the insurance business, which underwent a successful development was life and accident insurance. It has to be noted that the most serious actuarial research and development activities were registered in the life insurance field. For instance, the first tariffs in life insurance in Bulgaria were developed by the company “Bulgaria” already in 1893. Later, in the beginning of the 20-th century, most of the classical life insurance products existed on the Bulgarian market. The two companies “Teacher’s fund” and “Cooperative savings and insurance society of office workers”, found correspondingly in 1903 and 1905, specialized in life insurance and were very successful in the business with the classical whole, term and endowment life policies and with a number of their combinations. In addition, a

policy, named “Dowry” was designed to provide brides and grooms with some amounts of money in case of marriage and was quite popular at that time as well.

It is interesting to mention also that with and without profit policies were offered from the very beginning of the foundation of the insurance business. For instance, the actuaries of “Bulgaria” and “Balkan” designed with-profit policies, according to which between 60 % and 70 % of the profit from a certain portfolio was distributed among the insured, as dividends, either in cash or as a discount on the future premiums paid.

The company “Orel” introduced, for the first time in 1920, the so called “policies with increased risk”, to cover individuals with established disease or level of invalidity, exposed to higher risks. For the first time also the company Orel offered insurance cover to individuals without mandatory medical examination and endowment policies for children and insurance policies for orphans.

The joint life policies were introduced in Bulgaria by the company Balkan, as early as in 1895 and actuaries were directly involved in designing the products and calculating the tables of tariffs.

Another important area where actuaries were active in Bulgaria is reinsurance. The first reinsurance contract was signed in 1891 between the insurance company Bulgaria and the Insurance and Reinsurance Company of North America. Similar reinsurance contracts were signed later with other well known reinsurance companies in Europe. Munich Re was the German company which was the main shareholder of “Orel” since its establishment in 1914. It may be of interest to mention that the first Director of “Orel” was the German consul in Sofia and a number of German financial experts and some actuaries were involved in the Bulgarian insurance practice already from the very beginning of its existence. This was the case with the reinsurance company “Balkan”, mentioned in Section 1 above.

In the field of pensions, the actuaries were involved with developing annuities and related pension products. The first pension scheme in Bulgaria was established in 1908 by the assurance society “Balkan” and was designed to cover all office workers. A number of mutual pension funds emerged in the country since the beginning of the Century but many of them were not actuarially sound, and based on proper actuarial grounds. Thus, the profession did a lot to warn the public that many of them might become insolvent, as it happened later through the years.

Actuaries developed also the first life tables in Bulgaria. The first life table for use in insurance was developed by the actuary Bonju Bonev in 1920 and was named “A Table of the mortality of the population in Bulgaria” based on the general mortality data from the period 1901 -1905. The table was designed to serve for actuarial calculations, related to life insurance policies without medical examination. Later, in

1935 a second life table was published by the actuary Christo Petrov, named “A Table of the mortality of the population in Bulgaria for the period 1901-1910”. The table was published in the Proceedings of the Bulgarian Academy of Sciences v. 30, 1935. Other life tables appeared later but none of them covered the insured population. The most recent table was issued in 1990-1991.

It has to be noted that actuaries no longer preserved their important statute in the insurance company during the period 1944-1989. After the World War II the insurance business in Bulgaria was nationalized and only two, state insurance companies were created - the State Insurance Institute (SII) and Bulstrad. There were some few actuaries and mathematicians who did some work during the period, especially in the fifties and sixties. However, under the conditions of state insurance and lack of competition the role of the actuary declined and actuaries decreased in number.

After the changes in 1989 the actuarial profession was revived, new young actuaries were trained and joined the newly emerging private insurance companies. However their role is still underestimated in the period of transition to a real market economy and actuaries at present are mostly concerned with defining the premiums and the reserves of the insurance companies.

As mentioned, actuaries played an important role in the pensions area already from the establishment of the first insurance companies and pension schemes at the end of the 19-th the beginning of the 20-th century and up to 1944. After that, the pension assurance became part of a state social security system on a non-funded, pay as you go bases and no actuaries were involved in its operation. After the transition to a market economy in 1989 some important reforms of the state pension system were undertaken. A new State Social Insurance Fund was created and a National Assurance Institute (NAI) was established to manage the Fund. New actuaries were involved in the work of NAI and new actuarial methodology was recently applied in determining the level of contributions to the system and some other important parameters. A few private pension funds, operating as shareholding companies were also established. Actuaries are becoming more and more important for their activity in offering supplementary pensions.

### **3. The number of actuaries and members of the profession.**

The number of actuaries involved in the profession is difficult to be traced over the years. From the start of the insurance industry actuaries were few as were the insurance societies. Their number increased with the development of the industry. Thus, in the nineties of the last century there were about 5,6 actuaries, named “insurance mathematicians” and this number increased to about 15- 20 in 1924. The number of members of the Society of Bulgarian Actuaries was 26-30, as indicated in the official list of members, quoted in the only volume of the Bulletin of the Society,

published once in 1938. Since 1944 the number of actuaries decreased up to 5-10 as only two insurance companies - SII and Bulstrad were formed and there was no longer a demand in actuaries, coming from the private sector. A few mathematicians, performing some related actuarial tasks were involved in the social security pension system as well. This was the case up until 1993 when the professional body of Bulgarian actuaries was recovered under the name “Bulgarian Actuarial Society”. In 1996 the number of practicing members of the profession was 30-35 and this number is subject to dynamic changes along with the changes in the number of insurance companies (amounting to more than 100 in 1997) and the development of the insurance and supplementary pension providing business in Bulgaria.

#### **4. Formation of the professional body of Bulgarian actuaries.**

The Society of Bulgarian Actuaries was established in 1924. Information about the event can be found in the specialized insurance newspapers from that time, such as “Insurer”, “Insurance newspaper”, “Insurance overview” and “Orel”. The year 1924 is also quoted as the year of formation of the Society in the only volume of its Bulletin, published in 1938. The following major aims and goals of the Society were stated in the Chart, accepted on its founding meeting in 1924:

- a) to assist its members in improving their professional qualification and in performing independent actuarial, scientific research;
- b) to follow the development of the actuarial literature in all branches of the insurance science;
- c) to work towards improving the level of organization and to promote the modernization of the insurance business in the country, to discuss all questions and problems arising from the practice, to give scientific explanations and recommendations;
- d) to contribute to the creation of general scientific actuarial terminology;
- e) to work for improving the public awareness, concerning the principles of insurance science and business;
- f) to work in a close cooperation with related professional societies on problems of joint interest;
- g) to promote the creation of proper insurance legislation.

The Society was managed by a General Meeting of the Members, currently by a Managing Board. Members of the General meeting were all Honorary and Ordinary Members of the Society. Mr Christo Petrov was elected as the first president of the Society of Bulgarian Actuaries in 1924.

After 1944 the Society of Bulgarian actuaries ceased to exist and there is no information when this happened exactly. The Society was reestablished in 1993 by 19 founding members, under the name of “Bulgarian Actuarial Society”. Dr. Vladimir Kaishev was elected as its President in 1993 and a Chart was accepted. It was set very much in the spirit of the Chart of the first Society of Bulgarian Actuaries of 1924,

although no information about this first Chart was available at the time of the recovery.

## **5. The development of the actuarial education in Bulgaria.**

Actuaries from the very early period of the profession in Bulgaria were graduates of the colleges in trade and finance, situated in the towns of Russe and Svishtov on the Danube river. There, a good education in insurance business and finances was provided. A few of the actuaries had university degrees from the Mathematics Department of the Sofia University. Some of the first actuaries were trained in the universities of some of the European capitals, such as Prague, Paris, Vienna, Berlin. Later, the importance of Sofia as a major education center increased and was constantly increasing, especially during the transition period, after 1989.

In 1995-1996 a Post Graduate Diploma Course in Actuarial Sciences was organized jointly by the Bulgarian Actuarial Society and the Institute of Actuaries at Oxford and the Faculty of Actuaries at Edinburgh. The syllabus of the course included eight modules of approximately 25 hours of lectures each, covering actuarial mathematics, statistics and probability, economics and investment, social security and occupational pensions, principles and practice of life and non-life insurance. The modules ended up with written tests, provided by the UK lecturers. Corresponding diplomas were issued jointly by the Bulgarian Society of Actuaries and the Institute and the Faculty of Actuaries of UK to 20 students, to certify that they have acquired the basic knowledge of the actuarial techniques and their practical application. This course provided the core tuition set to develop further actuarial qualification courses and examinations at the Bulgarian Actuarial Society. The organization of the Diploma Course was also supported by the Know How Fund of the British Government and the lectures were delivered by members of the Institute and the Faculty of Actuaries in the UK.

After 1993 the Bulgarian Actuarial Society and the Institute of Mathematics of the Bulgarian Academy of Sciences and the Faculty of Mathematics of Sofia University organized some educational courses and seminars on various actuarial, insurance and pensions related subjects. The first two seminars were devoted to research results and practical actuarial methods and were lectured by Prof. Steven Haberman, Arthur Ranshow, Philip Booth and Andrew Adams from the Department of Actuarial Science and Statistics of the City University of London and Mr John Bannon from Ernst & Young. The topics were on modeling of pension schemes, profit testing, use of generalized linear models for graduation and investment and new methods of property valuation. The seminar was attended by 15 -20 academics, students and actuaries from companies.

In May 1994 there was a third seminar, especially devoted to the problems of pension provision. Such well known specialists in the field as Mr Chris Daykin, Government

Actuary of the UK, Mr Peter White, Group Pensions Manager at Tate & Lyle Pension Trust and Mr Wladek Koch, Director Consultancy at Nobel and Lowndes were invited as lecturers . All seminars were very well attended. There were about 40 Bulgarian specialists from insurance companies, emerging pension funds and the General Directorate on Pensions, who attended the pension seminar. It has to be noted, that the organization of the seminars was to a significant extent supported by the British Council and the British Know How Fund.

The Bulgarian Actuarial Society established good links with the Academy of Sciences and Sofia University, Probability and Statistics Department It assisted also to the introduction of some basic courses on insurance mathematics for the students of the Faculty of Mathematics of the Sofia University, specializing in probability and statistics. About fifteen students have defended master theses in actuarial science under the supervision of members of the academic community, of specialists in actuarial mathematics and its applications Their topics were in risk and credibility theory, investments, matching of assets to liabilities, Markov Processes and their application to health insurance. Almost all of them joined some of the private insurance companies.

Some courses in actuarial and financial mathematics are also offered to the students at the Economics universities in Sofia and Svishtov as well as at the Technical University in Sofia. Since in most of the countries in Europe the actuarial education is delivered through the professional bodies of actuaries we believe the same approach might be reasonable in Bulgaria as well. The unified actuarial syllabus, set by the Groupe Consultatif for the standards of the qualification of actuaries in EC will have to be adopted.

## **6. The role of the actuaries and the national insurance and social security legislation.**

An important goal which the Society of Bulgarian Actuaries set, immediately after its establishment in 1924, was to assess the draft of an “Act on the State Supervision on the Activity of the Private Insurance Companies” in Bulgaria and to give detailed comments and suggestions on the role of actuaries in the insurance company and in the supervisory process. A number of papers on these two issues, written by actuaries, appeared and were followed by a public discussion during the winter of 1924/25. The Act was officially approved on 26.07.1926 and two supervisory bodies were introduced to perform all the necessary supervisory and monitoring functions over the insurance business. One was the Supervisory Committee in which professionals, related to insurance were widely represented and the other one was the Supervisory Department of the Ministry of Finance with current technical responsibilities. Unfortunately, the Act did not provide for a representative of the actuarial profession to be a member of the Supervisory Committee. Thus, the efforts of the profession for a formal recognition and regulation of the role of the actuaries in the supervision of

the insurance failed. This was due to the position of the Prime Minister Mr Andrei Liapchev who rejected the proposition of the corresponding Commission of the Parliament to have an actuary in the Supervisory Committee. The profession succeeded to regulate legally only the role it had to play within the insurance company. This important role was formally regulated by the “Regulations for the Application of the Act on the State Supervision on the Activity of the Private Insurance Companies” in Bulgaria, introduced on 01.02.1927. In the para on reserves, Art 19 it was stated that the actuary had to calculate, at the end of each year, the unearned premium reserves and other, “mathematical” reserves for the insurance policies. The actuary was obliged to follow the so called “insurance plan” and to sign all documents, which contained information on the total reserves and solvency margins.

It has to be mentioned that, although not formally required, an actuary *was* invited to become a member of the first Supervisory Committee in 1926 and this was Mr Lubomir Chakalov, professor of Mathematics from the Faculty of Mathematics of Sofia University “St. Climent Ochridsky”. Professor Chakalov played an important role in creating sound mathematical foundations of the actuarial science in Bulgaria. He was and is also an internationally honored and recognized mathematician, known for a number of fundamental achievements such as his 1938 paper on piecewise-polynomial (spline) functions. Three other prominent members of the actuarial profession - Bonju Bonev, Kiril G. Popov and D-r T. Dedov entered the Supervisory Committee all at one and the same time in 1926. One year later, when the Department of Supervision of the Ministry of Finance was organized, four other representatives of the actuarial profession became its first members, occupying the most high ranked positions. Thus, the President of the Society of Bulgarian Actuaries Mr. Christo Petrov became the Deputy Director of the Supervisory Department, the actuary Mr Pejo Peev became the Director of the Supervisory Department and the two actuaries Mr. Boiko Zvetanov and Mr Peter Kossev became correspondingly Inspector in Chief and Inspector of the Supervisory Committee.

It has to be noted, that actuaries played an important role in the pension field and this role was regulated from the very beginning. Thus, according to the “Act on the Social Security”, approved on 20.02.1924 one representative of the actuarial profession was entitled to be a member of the Supreme Council of Labour and Social Security. The latter Council was an institution, attached directly to the Ministry of Trade and Industry. It was entitled to discuss and prepare all important decisions made by the Government in the field of Social Security. Thus, the Act on the Social Security of 1924 was the first official document in which the role of the actuaries in the social security and pensions field was formally recognized. According to the Act, a “Social Security Fund” was found to provide mandatory social assurance in case of an accident, sickness, disability, old age, maternity. It covered all citizens, engaged in state private and municipal organizations, to whom non of the provisions of the “Pensions Act” applied. The actuary of the fund became Mr Ivan Katzarov, who

became later a professor in actuarial mathematics and significantly contributed to the actuarial science.

On the 17.06.1926 the Parliament approved a pension law on “pensions for time in service”. According to the law, a Pension Fund was established, as a subsidiary to the Department of the State Depts. The Fund was managed by a Board of Managers, which took care of the most efficient investment of the assets of the Fund and worked for the improvement of the pension system as a whole. On the 28.06 1932 a new pension law was accepted, concerning the “pensions for time in service”, according to which one representative of the actuarial profession, appointed by the Society of Actuaries was eligible to a membership in the Board of Managers of the Pension Fund.

On 25.05.1932 “Regulations on the activity of the pension and mutual insurance funds”, which were aimed at providing assurance services were issued. In para 20 of the Regulations the responsibilities and the obligations of the actuaries were stated. The actuary was defined as an expert, who had to perform a detailed actuarial evaluation of the premium reserves on every five years, i.e., to do the valuation of the pension fund.

In 1944, after the political change in the country, all existing legislation was abolished and new legislation was introduced, in which nothing was mentioned at all about the actuary and the actuarial profession. The activity of the Society of the Bulgarian Actuaries was canceled after 1944 for more then 45 years. The Society was reestablished in 1993 as “The Bulgarian Actuarial Society”. In 1996 a new law on insurance was accepted by the Parliament in which it is stated that an insurance company has to have an actuary with a proper background if it wants to receive a license.

## **7. Contributions of Bulgarian actuaries to the development of actuarial science.**

At the early stages of the development of the actuarial profession in the country Bulgarian actuaries did not have a well developed means of communication with the rest of the actuarial community. Some major actuarial knowledge was of course available through the international contacts of the early actuaries, but in many practical problems actuaries had to develop ideas and concrete actuarial techniques, independently, by themselves, although some of these techniques might have been internationally known by that time.

On later stages of the development of the actuarial profession actuaries managed to create good international contacts with actuarial societies and academic actuaries (insurance mathematics professors) abroad. Members of the Society of Bulgarian Actuaries participated in the international congresses of actuaries. Written evidence of a Bulgarian participation in the work of these congresses starts from the 8 th

congress in London in 1927 and later the 9-th, 10-th, 11-th and 12-th congresses, correspondingly held in Stockholm Rome, Paris and Lucerne.

Some important contributions to actuarial mathematics are currently being made by some Bulgarian academic actuaries in the field of risk and ruin theory and life insurance. It may be expected that the number of such contributions will increase, having in mind the interest in the field, which was demonstrated by young actuaries and students.

## **8. Actuarial influences from foreign countries.**

The development of the Bulgarian actuarial professional knowledge has been significantly influenced by the German, French and British actuarial schools since the end of the 19-th century and up to present times. Following are some historical facts in this connection. The first life tables, which were used in the life insurance practice in Bulgaria were the life tables of “the 20 insurance companies in Great Britain”, published in 1869. The State Supervision on the Activity of the Private Insurance Companies” in Bulgaria required in 1927 that the companies use this life tables in their actuarial calculations. The impact of the British actuarial knowledge on the development of the profession in Bulgaria was considerably bigger in recent years, due to the fact that 21 Bulgarian actuaries received diplomas in actuarial Science form the Institue and the Faculty of Actuaries in Great Britain. Another important project between the Department of Actuarial Science and Statistics at City University in London, the Institue of Mathematics of the Bulgarian Academy of Sciences and the Faculty of Mathematics of the Sofia University allowed for transferring of actuarial knowledge from the UK to Bulgaria in the form of tuition materials, books, seminars of lectures, delivered by academics and actuaries from the UK for Bulgarian specialists, exchange of visits etc.

Bulgarian actuaries had close links with their German and French colleagues as well and we will shortly mention some of them. One of the first Bulgarian Actuaries, Ivan Giuzelev quoted in his book of 1911 that he had contacted and communicated parts of his book to the Paris professor Rene Poussine. He also referred to the book *Wahrscheinlichkeitsrechnung*” of the German author E Czuber, issued in Leipzig in 1903. The actuary Ivan Katzarov also quoted mostly German authors in his textbook on actuarial Mathematics of 1954.

There were also some foreign actuaries who worked for Bulgarian insurance companies for quite some years and contributed to the transfer of practical actuarial techniques and methods. The first Director in Chief of one of the first insurance companies in Bulgaria - “The national assurance society Balkan” established in 1895 in Sofia was Otto Billik, who came from Romania. Later, in 1924, when Balkan split into three companies, covering life, non-life and reinsurance, the German specialist Fridrich Neuman became the director of the Reinsurance company.

## **9. Important actuarial books, papers and other publications.**

The first actuarial book in Bulgaria, entitled “An elementary guidebook in calculation of premiums and reserves in life insurance” was written by the Bulgarian mathematician and actuary Ivan Giuzelev and was published in 1911. He was obviously one of the first authors of actuarial papers. He published in 1906 an actuarial paper, entitled “Life insurance contracts”, which was an overview of the life policies, offered by the existing at the time four insurance companies. His book of 1911 comprised the first, but very successful textbook in actuarial mathematics. It was devoted to the equations for the calculation of premiums and reserves in: whole life, term life and endowment insurance contracts, and combinations of them; contracts with return of the gross premium in case of death before maturity, annuity type contracts, annuities combined with risk elements, various types of endowment insurance contracts for children, joint-life contracts etc.

Another important early actuarial work was the life table, entitled “A table of the mortality of the population in Bulgaria”, published in 1920 in Sofia and prepared by the actuary Bonju Bonev. The table reflected the general mortality of the population for the period 1901 -1905 and was designed to be applied in calculations, related to life contracts without a medical examinations of the insured.

Chapter 2. “Probabilities, life assurances and mortality tables” of the book of D. Kolev, entitled “Political Arithmetic” reflects further developments of the actuarial knowledge in Bulgaria. The book was published in 1925 when its author was a lecturer at the college, specialized in “Trade and Finances” in the town of Svishtov. A detailed description of life tables and its use in insurance is given in Chapter 2. All types of single and joint life policies, annuity contracts and related problems of calculation of net and gross premiums and reserves are further described.

In 1926 the actuary Alexander Ivanov published in the Journal of the Bulgarian Society of Mathematics and Physics a survey paper, entitled “Principles of Life Insurance”, which played an important role in presenting the fundamental actuarial principles and ideas to a wider auditorium of interested readers.

Special credits have also to be given to the creation of a “Table of the mortality of the Bulgarian population for the period 1901-1910”, due to Christo Petrov. The table was published in the Proceedings of the Bulgarian Academy of Sciences v. XXX of 1935. Two years later, Bonju Bonev and Ivan Koiumdjiev published a book, entitled “Assurance tables with and without medical examination, based on the life tables of the 20 British insurance companies and of the general mortality of the population in Bulgaria”.

Two other life tables were produced in the fifties of our Century by a team of researchers, headed by Prof. Kiril Popov from the Institute of Mathematics of the Bulgarian Academy of Sciences, covering the period 1920- 1926 and 1926-1934.

An important initiative of the Society of the Bulgarian Actuaries was the decision to publish a Bulletin of the Society, reflecting the entire scientific and research activity in the actuarial field. The first volume of the Bulletin of the Society of Bulgarian Actuaries appeared in 1938. It contained a survey paper on the work of the 11-th World Congress of actuaries in Paris in 1937, followed by seven other original papers of Bulgarian actuaries, addressing actuarial questions of life insurance, pensions and agricultural risks. Since this volume of the Bulletin turned to be the only volume, published ever since we would take the chance to comment on the content of some of the papers. An interesting paper is the one, written by Christo Petrov on the advantages of the actuarial approach to organizing and running “mutual assurance funds”, institutions which were quite popular at the time in Bulgaria. Incorrect and not very fare methods of defining premiums and managing the funds were strongly criticized by the author. He showed the advantages of the group life polices, designed by actuarial methods, contrary to most of the “mutual funds” at which no actuarial calculations were performed at all. The author was also concerned with the methods of calculating the average premium, the mathematical reserves and the surrender values in group life contracts

Another important paper from the 1938 Proceedings of the Society of Bulgarian Actuaries, due to Prof Ivan Katarov is devoted to the state social insurance fund named “Social Assurances” and its operation. It is worth mentioning that Prof Katarov was one of the prominent Bulgarian actuaries. He worked as an actuary at the fund “Social Assurances” and was a very good teacher and researcher as well. He is the author of a textbook on “Actuarial Mathematics”, issued in 1954 and has published a number of research papers on actuarial subjects. As stated in his paper of 1938, Prof Katarov used some ideas and methods developed in the German actuarial literature as a bases of his concepts. He gave an accurate actuarial treatment of the questions of defining the premiums in invalidity pension contracts, survivors, orphan and old age pensions. He also criticized, as other actuaries did, the way the mutual assurance funds were managed and performed and in particular, the lack of mathematical reserves therein.

Among the very few recent actuarial texts in Bulgarian language it is worth mentioning the translation of the lecture notes of the Post Graduate Diploma Course in Actuarial Science 1995-96, organized jointly by the Bulgarian Actuarial Society and the Institute of Actuaries at Oxford and the Faculty of Actuaries at Edinburgh. The volume of the translated lecture notes, issued by the Bulgarian Actuarial Society, is over 2000 pages, covering actuarial mathematics, statistics and probability, economics and investment, social security and occupational pensions, principles and practice of life and non-life insurance.

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