

INTERNATIONAL ACTIVITY IN FIELD OF LIGHT AND ENGINEERING: CREATIVE REPORT

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ABSTRACT

This article is not a memoir. It aims at summing up the author’s activity (in a concise way) in solving the challenge he set for himself: to assist in development of Russian lighting engineering industry with consideration of the greatest achievements in design of lighting devices, their manufacturing technologies and the newest high-performance equipment as much as possible.

The author considered it important not just to sum up 65 years of his activity in light engineering and industry but also to provide the new generation of specialists with an opportunity to know and use the accumulated information and ways to take this opportunity for the benefit of Russian industry.

Keywords: light and engineering, daylight guidance, hollow light guide technology, diffuse luminaires, adjustable chromaticity

1. Participation in Works of International Lighting Engineering Organisations

1.1. Took part as a member of the International Electrotechnical Commission (IEC):

– In the Lighting Engineering committee 34 (*Lumex – Luminaires Panel*, 1965–1985);

– In development of basic international standards: *Luminaires for tubular fluorescent lamps* (*Publication 162*, 1972) and (*Publication 598*, 1977) *Luminaires Part 1: General requirements and tests*;

– Translation of the first standard into Russian and its publication as a book (in cooperation with A.V. Ochkin);

– Participation in IEC congresses in London, Munich and Stockholm.

1.2. Participation in the work of the International Commission on Illumination (CIE, Division 3) from 1980 to 2017. Proposed to establish a technical committee for the *Hollow Light Guides* problem in CIE, supervised a group with such name and then the technical committee TC3–30, which was established during the Melbourne Congress. From 1990 to 1998, was acted as Chairman of this TC3–30. The first meetings of the TC were held in Stockholm, Washington DC, Berlin and Trondheim. At that period of time, the first revision of the publication had been prepared. Was further forced to resign from the position of the chairman of TC3–30 due to lack of funding for participation in further meetings (worked only by correspondence). The publication was finally approved and published in 2005 (*CIE164:2005 Hollow Light Guide Technology and Applications*)

However, somewhat earlier, some reports on the results of development and research of hollow light guides during the CIE congress in Baltimore (1990) as well as in Seattle and San-Diego had been made.

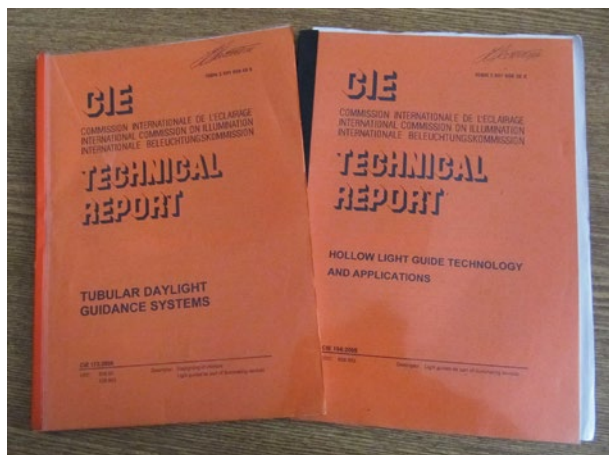


Fig. 1. CIE TC reports *Tubular Daylight Guidance Systems* and *Hollow Light Guide Technology and Applications*

Participated in the work of the CIE TC Tubular Daylight Guidance Systems regarding preparation of a publication on transfer of solar light into buildings by means of hollow light guides (CIE173:2008). Both reports are presented in Fig. 1.

2. Participation in International Events

2.1. Participated (without making reports) in CIE congresses in Shanghai, New-Delhi, Munich, Istanbul, Edinburgh, and Copenhagen.

2.2. Delivered lectures at invitations of universities of Berlin, Edinburgh, Berkeley, Helsinki, Ilmenau. Made reports and delivered lectures as a guest speaker in Spain (together with V.M. Pyatigorsky), in Madrid and Barcelona, as well as at international lighting engineering exhibitions in Moscow, Hannover and Frankfurt am Main (Germany) as well in such companies as 3M (USA), Trilux and Sélux (Germany), Zumtobel (Austria), Bühler-Scherler (Switzerland), Targetti and PRC (Italy, Florence and Bergamo). In Florence, the report was made in the Targetti's Lighting Academy, the former castle of Amerigo Vespucci, the discoverer of America which was named after him, reconstructed by the company.

2.3. Participated in major international light engineering exhibitions in such cities as Moscow, Hannover, Frankfurt am Main, New York, Shanghai, Berlin (Berlinare), Bern, Valencia, Milan.

Had been the deputy chairman of the Organising Committee of the international exhibition Inter-Light for 17 years and supervised its scientific part.

Proposed an idea of arrangement of a regular LED Forum as a part of the Inter-Light exhibition, organised it and supervised its work for the first two years (the Forum has been acting for 13 years since 2005).

The lectures and reports delivered abroad usually related to:

- Current situation in developing and manufacturing new lighting devices and trends in their further development;
- Hollow light guides, design principles, main advantages and scope of use;
- Main directions of energy saving in lighting installations, methods and means of power consumption reduction (the role of LDC, ballast, automatic control, methods and conditions of operation, degree of protection of lighting devices, etc.).

Among the articles published in foreign journals, the following should be mentioned:

- On heat mode of lighting devices with different light sources, *Energie Journal* (Germany);
- On current state of lighting engineering in Russia, *Journal of Lighting* (UK);
- A series of articles on hollow light guides, *Licht Journal*;
- On classification of light distribution curves of lighting devices and the new system of LDC tolerances, *Lighting Research and Technology*.

3. Publisher's Activity

3.1. In 1993, by Allerton Press in New York, founded the *Light and Engineering Journal* as scientific and technical English-language version of

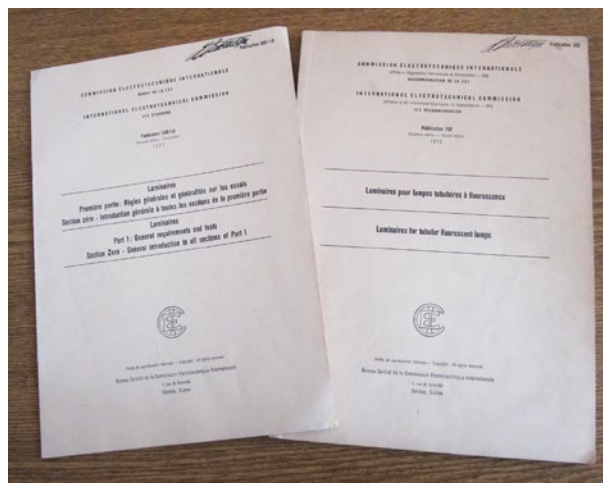


Fig. 2. Publications prepared as part of Ju.B. Aizenberg's work in IEC



Fig. 3. Diffuse luminaires with adjustable chromaticity

the famous Russian Svetotekhnika Journal founded in 1932, Fig. 2.

3.2. Wrote and published a book *Hollow Light Guides* in English (Fig. 3) and sent it out to all specialists in this field in Russia, the USA, the UK, Germany, Italy, Switzerland, and Australia.

3.3. Received patents for developments of light guides and a new type of joint industrial luminaires with common ballast for two devices. Patents for hollow light guides and their structures have been received in the USA, the UK, Germany, France, Italy, Switzerland, Japan, and Sweden, starting from 1975.

3.4. Russian government sold the licenses for hollow light guides to Japan and Italy.

I would like to answer the question readers may definitely have: why were not these brand new installations and assemblies originally created in our country?

Unfortunately, the answer is simple and upsetting. There were no technologies and equipment required for implementation of these new ideas in the 1990s in Russia. Such technologies primarily include extrusion of large-diameter (about 0.25m and more) PMMA pipes which no chemical manufacturers had. In particular, that is why Vatra Production Association started producing first light guides only of PET-film which is not appropriate for solving a number of new problems.

The second and not less important factor was bureaucracy and fear of innovations which reigned among managers of the leading design facilities



Fig. 4. View of *Heliobus* heliostat

whom we offered to introduce heliostats and light guides in their projects (Tyazhpromelektroproekt, Elektroproekt, Elektromontazh, Stalproekt, etc.)

We had to publish the articles on the new ideas in the *Licht* journal and received a number of quite interested responses.

In particular, the design division of Bühler-Scherler (Switzerland) sent us a letter on their great interest in implementation of our idea on transfer of solar light and lamp light into insufficiently illuminated premises through the same light guides. The company expressed their readiness to implement this solution provided that we develop the design project of the installation. This project called *Heliobus* (designed in cooperation with A.A. Korobko) was implemented in a four-storey school building in St. Gallen (Switzerland), it is still successfully operated and was granted the golden medal of an international environment preservation exhibition in Bern.

The same happened in the case of Sélux company (Germany) which was interested in hollow light guides with rigid channels.

4. Provision of Scientific Consulting Services at Invitations of the following companies:

- 3M (Saint Paul, USA), in the field of hollow light guides;
- Bühler-Scherler (St. Gallen, Switzerland), in the field of heliostat-and-light-guide systems for

transfer and distribution of both solar light and artificial light from lamps through the same light guide channels. Management, design preparation (in cooperation with A.A. Korobko) and supervision of installation of the Heliobus assembly in a multi-storey school building in St. Gallen (Fig. 4);

– Sélux (Berlin, Germany), in the field of rigid hollow light guides with one-side and two-side inlet devices and new x-shape reflective optical systems. New assemblies, mostly with vertical light guide channels, were installed. A large lighting installation was installed by Sélux at 32 pedestrian crossings of the Moscow Ring Road under my supervision.

5. Information Collection and Analysis, Elaboration of Recommendations, Assistance to Russian Companies

During each congress, conference, symposium and exhibition, I aimed at familiarising myself with productions of lighting devices by local companies (with their own technologies, equipment and specialists).

As a result, I accumulated a large amount of information. I used these materials for two purposes:

- Elaboration of recommendations for Russian companies (especially those, which were oversaw by me) and assistance in purchasing of contemporary equipment and technologies from foreign companies;
- Arrangement of 23 presentations of the leading light engineering companies demonstrating their best samples of lighting devices and process flow diagrams (such as Philips, Motorola, Trilux, Fagerhult, Artemide) in Moscow House of Light.

Some of important results of this activity led to significant enhancement of technological level of industry in Russia:

- Vatra Production Association (R. Yu. Yaremchuk) purchased an unique, for that time, set of large-size equipment (with weight of 96 tons and mould-clamping force of 1600 tons) and accessories for pressure casting of box-shape prismatic large-size PMMA diffusers (for public building luminaires with 4 and 2 (40/36 W) fluorescent lamps (FL)). Very complex moulds with 9 ports necessary for this production process were also purchased as a part of the set. This unique equipment and technology were used by Krauss Maffei in Munich.

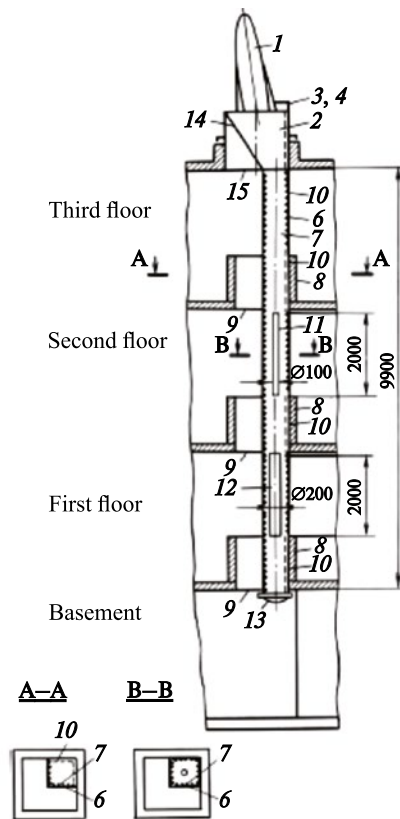


Fig. 5 Heliobus scheme

Using the obtained information, with assistance of the Ministry for Electrical Engineering Industries, Vatra purchased the equipment and technology and commissioned it, which allowed association to manufacture cutting-edge equipment for three decades.

- Ardatov Light Engineering Plant obtained two important sets of information, one regarding manufacturing of FL luminaires with aluminium bodies manufactured using the continuous pressure method, the other one regarding high-speed extrusion of open profiles of PMMA diffusers for one-lamp FL luminaires.

Both sets of information were efficiently used by the plant (by V.V. Barmin) with assistance of VNISI, and that allowed plant to significantly increase technical level of the plant’s products. Speaking of the unsuccessful attempt to purchase unique equipment for continuous compaction of silumin bodies, these tasks were partially solved by establishing (in cooperation with V.V. Barmin) strong ties with two Russian aluminium structure plants in Voronezh and Leningrad and development of a series of PVLM luminaires with extruded bodies for production premises with hard environment by the Ardatov Light Engineering Plant (V.V. Barmin) and VNISI.



Fig. 6. View of the illuminating part of *Heliobus* indoors

– Using our information, VNISI purchased an automated computer station for measurement of street luminance by means of a car-mounted camera while moving at speed of up to 80 km/h from the Ilmenau Technical University and Tekhnoteam company. Commissioning and installation in VNISI were performed by A. Sh. Chernyak.

– After I familiarised myself with the world's best producers of wiring accessories in Germany (BJB) and Italy (PRC, Varese), Russian producers of fluorescent lamp luminaires completely switched to FL lampholders, terminal strips, connectors and starter holders produced only by these companies whose interests, upon our recommendations, started to be represented by the Tochka Opory company as well as the plants in Ardatov and Riga (V.V. Kreismann).

The presentations of foreign companies in the Moscow House of Light were of special importance for training designers and engineers of Russian enterprises. Unfortunately, for many decades, this creative community of industrial specialists had not been able to visit foreign exhibitions and especially companies' production facilities. That is why, for 20 years, one of the most important missions of the House of Light in the field of international activity was to arrange presentations of cutting-edge design solutions, technologies and production achievements of leading companies for Russian specialists.

6. Some of Presentations and Innovations Providing for the Light Engineering Industry:

– New rolled and sheet reflective materials with reflectance of 0.995 by Alanod (Germany). Presentation of this company in Moscow with participation of all plants of the industry led to almost com-

plete transition of such enterprises as Nordcliff, Svetovyye tekhnologii, Ardatov and Riga plants to reflective aluminium for manufacturing reflectors. This allowed luminaires performance to significantly increase and provide required LDC;

– Electronic controllers for lighting installations (SELC, Ireland);

– Contemporary power tracks for LI (Eutrac, Germany);

– Landscape lighting and special luminaires (Futur Plast, Italy);

– Series of special luminaires for emergency lighting (Begelli, Italy);

– New Scandinavian luminaires for industrial and public buildings (Fagerhult, Sweden);

– Modern design of luminaires (Artemide, Italy);

– New photometric equipment (Licht Mess Technik, Germany);

– New generation of advanced thin T5 FL's and luminaires based on such FL's (Philips, Osram);

– Extruded profiles and tubes for lighting products (Poliflex-Athex, Italy, Germany);

– Efficient local lighting luminaires (Waldmann, Germany);

– Electronic ballasts for high pressure mercury lamps (Eltam Ein Hashofet, Israel).

It should be noted that all this international activity turned out to be a medium for both my scientific activity and for Svetotekhnika and L&E journals as well as for the House of Light. Ties established with leading specialists and the subjects of these presentations provided the journals with most valuable and fresh scientific information. Materials from the reports were published in our journals. Personal acquaintance with managers of leading companies allowed us to solve problems of organisation of the presentations with expensive transportation of products ordered in large amounts for presentation.

It was a pleasure to see how specialists received answers for important questions related to design and introduction of production technologies during the presentations and after them and received very interesting information at first hand. Usefulness of these events was doubtless.

Summing up this part of my activity, though not the main one (see Svetotekhnika #3, 2017), it seems to me that its results undoubtedly had caused important positive influence on increase in scientific and technical level of Russian lighting engineering products, modernisation of the industry and

increase of knowledge of designers and engineers of enterprises.

COLLEAGUES MEETING AND THE CAREER OF PROFESSOR JULIAN AIZENBERG CELEBRATING

The International Scientific and Technical Greenhouse Lighting Conference took place on the 9th of September 2019, one day prior to the opening of Inter-Light Russia / Intelligent building Russia 2019. The evening of the conference saw a reception hosted by George Boos, chair of the scientific and technical council “Svetotekhnika” and head of light and engineering department at the Moscow Power Engineering Institute. Guests at the reception included conference attendees and members of the editorial board of the international journal “Svetotekhnika”/ Light & Engineering. The event was attended by nearly one hundred experts, including CIE President Peter Blattner, and IEC’s Attoinette Pitteloud and Andreas Sholtz.

The event celebrated the career of the oldest Russian scientist in field of light and engineering Prof. Julian Aizenberg, and the publication of the Lighting Handbook, 4th edition. G. Boos introduced Ju. Aizenberg as an internationally renowned scientist, who has dedicated his life to lighting science, technology and development, and establishing new pathways in the field together with colleagues. Aizenberg has mentored a generation of important lighting specialists and developers in Russia. G. Boos counts himself among Aizenberg’s students, and has learned much from him. Julian Aizenberg has worked ceaselessly at the VNISI institute for lighting science and technology for over 65 years, has spent more than 50 years heading up the journal “Svetotekhnika”, created the international journal “Light & Engineering” and the series of “Lighting Handbooks”.

G. Boos referred to him as a “living legend”, universally respected as a leading authority in the field, person who has combined his R&D talent with unique organisational skills and diplomacy. His re-

spect and kindness towards others have enabled him to elegantly solve complex situations.

Maintaining the reputation and enhancing the quality of the journal for fifty years has required a diversity of knowledge, a reserve of patience and the constructive engagement of a wide stakeholder base, including scientists, the private sector and governance stakeholders; all experiencing frequent political and economic upheaval.

In his speech, CIE President Peter Blattner confirmed the international renown of Julian Aizenberg and his work, with particular reference to the Helio-bus installation – a hollow light guide heliostat operating in Switzerland for more than 25 years.

G. Boos brought the celebration to a close with a selection of Julian Aizenberg’s favourite musical pieces and best wishes for the future, which were echoed by applause from the audience.

Julian Aizenberg responded with the following: “I am very grateful to George Boos for this magnificent surprise and amazed by the idea and its realization. I am overwhelmed, and feel that you have presented a portrait of an ideal expert and person. I have always aspired to this, but have yet some way to go along the path to perfection, and to go all the way is likely impossible. I am eternally grateful to George Boos and I am very moved by this event. I also express my thanks to Peter Blattner, to all my colleagues and friends here today.”

Editorial staff and members of the board would like to join in with the words of George Boos and thank him for the event. We would also like to add that Julian Aizenberg together with students and colleagues over the years has developed a wide range of new lighting devices, including ground breaking LDs with hollow light guides, established the Moscow Light House, authored ten books and several hundred articles in peer reviewed journals, claimed many patents and is the only lighting scientist to hold the title of Honoured Inventor of the Russian Federation.

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