FORWARD

Ongoing process of integration in Europe, in the Central and Eastern part of the continent expressed in Central European Initiative (CEI) activity, is a part of the trend for the political unification associated with broad alliance of civil initiatives, including environment, culture, mobility, trade and commerce. The region is of crucial importance not only at European scale but, thanks to its location, its role is expected to be a crossroad on the routes connecting East and West or, in the updated political terminology, South and North. Stability of transportation routes used for international and domestic trade and of lifelines serving on both regional and trans-national scale (oil and gas pipelines, electric power and telecommunication cables etc.) is vital from the geopolitical viewpoint. Within the scope of natural sciences, this stability is threatened by natural events with possibly disastrous consequences as earthquakes, large landslides and floods. The problem of Preparedness to Meet Natural Disasters (PMND) is crucial in the effort to reduce the vulnerability of the lifeline systems and communications. Additionally, it is complicated due to the different levels of PMND at the distinct national scales. PMND becomes of crucial importance more and more strongly within the ongoing integration processes in Europe and worldwide [e.g. Blueprints of the World Congress on Disaster Reduction, August 2001, Washington, USA]. The mitigation of natural risks in Central Europe requires a transnational interdisciplinary frame collaboration, which includes theoretical and experimental studies in the field of geology, geophysics, geodesy, seismology, earthquake engineering and earthquake risk management.

The publication by the Bulgarian Seismological Service of the presentation made by August Sieberg in Sofia falls in a special part of the historical golden reference which lead to the roots of the earthquake engineering and presents a great success of the long lasting international collaboration between the Institutes in Jena and Sofia, which though formally decided in April 1939, had practically existed much before. The book, that we consider particularly fit to the spirit of CEI, was originally published in Bulgarian language in 1943, after Sieberg joined the Bulgarian Seismological Service in Sofia in 1939. The present translation into English is based on an original edition of the book found in the archives of the Strasbourg Institute of Physics of the Earth, a set of archives moved several times during and after World War II. This second edition shows how well advanced the perception of seismic vulnerability of European buildings was in the 1930s. It furthermore spreads some light on the international cooperation among European seismologists in the difficult times preceding World War II. This bilingual photo-type edition of the publication wants to be a tribute to his numerous scientific achievements. The book focuses on methodological approaches driven by the results of shaking table experiments and by the analysis on the origin, prevention and reduction of earthquake damage.

August Sieberg[1] was born in 1875 in Aachen and he died in 1945 in Jena. Before World War I, he was attached to the International Seismological Association (ISA) and to the main Seismological Station of Germany in Strasbourg, both founded at the beginning of the XXth century by Georg Gerland, Professor of Geography at the Wilhelm II University. Famous German seismologists have been working there before World War I, e.g. Beno Gutenberg, Oskar Hecker, and August Sieberg (Schweitzer & Lee, 2002). After the war, the German seismology was strongly handicapped due to the lost of working and research facilities for scientists in Strasbourg. Gutenberg, after a long unemployment time, moved to the California Institute of Technology in Pasadena. Hecker and Sieberg moved to Jena. Hecker was nominated head of the new *Reichsanstalt für Erdbebenforschung* and Sieberg was appointed Professor of Geophysics. We learn from the introduction of his book that he had a past experience as an architect. He was also known for his talent as painter (Schweitzer & Lee, 2002). His publications cover a broad field of topics. For example, he published in 1908 a treaty on physical geography illustrated with beautiful drawings *"Der Erdball seine Entwicklung und seine Kräfte"*. This later book covers astronomy and all aspects of Earth Sciences, including volcanoes, earthquakes, paleontology, climatology and glaciology. In 1939 he published the first catalogue for historical earthquakes in Germany and surrounding areas which is often cited.

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[1]Informations on August Sieberg's biography can be found in:

Krumbach, G. (1949). August Sieberg zum Gedächtnis. In: Seismische Arbeiten 1947/48, Deutsche Akademie der Wissenschaften zu Berlin, *Veröffentlichungen des Zentralinstitutes für Erdbebenforschung in Jena* **51**, 6-9.

Schweitzer, J. & W. H. K. Lee (2002) *Earthquake and engineering seismology, W. H. K. Lee, H. Kanamori, P.C. Jennings and C. Kisslinger, Acad. Press*, part B, Chapter 88.

Considering his various talents and his obvious interest in geology and natural hazards, we may understand why Sieberg favoured studies on the social and economic consequences of earthquakes. He got strong interest in macroseismic enquiries and mitigation of earthquake damages. While belonging to the staff of the ISA in Strasbourg, he compiled data on macroseismic observations and geographical distribution of earthquakes and he developed and published an adaptation of the macroseismic intensity scale of Françoise-Alphonse Forel and Giuseppe Mercalli. He followed Adolfo Cancani's suggestion and defined for the first time a 12-grade macroseismic intensity scale (Schweitzer & Lee, 2002), with the property that an increment of one unit in intensity roughly corresponds to a doubling of the peak ground acceleration: "The only scale taking into account the ground acceleration is the twelve levelled intensity scale of Cancani (Table I). In any case, as any specialist is aware," Sieberg writes "it is only a complementary mean, which has not been replaced so far by anything better. Despite that, it is good enough for our needs, thanks to the broad range of each discrete intensity level When using it, we certainly should always keep in mind its uncertainty and treat it with criticism.

Table I. Cancani's intensity scale of ground acceleration in cm./sec.²

Degrees according to Mercalli – Sieberg	IV	V	VI	VII	VIII	IX	X	XI	XII
Minimum	1	25	5	10	25	50	100	250	500
Average according to Gasman	1.6	3.4	7.3	16	34	73	160	340	?
Maximum	2.5	5	10	25	50	100	250	500	?

The twelve-levelled scale of Mercalli and Sieberg is adapted from Cancani's scale. That is why it is exclusively used here, although there are other tables that allow passing from their scales to the Cancani's or Merccalli's. In connection to the above, it should be paid attention to the fact that all seismic intensity scales, contrary to the widely spread opinion, display only the *actions*, but *never the seismic intensity*. The building behaviour and the soil conditions are hidden in the visible picture of the damages, as well some other hazards ”impact”.

A part from a few shortcomings, evidenced by the development of science, like the proposal to use in roofs asbestos-cemented plates, not only because they are fireproof, but also because they can be well fastened, the book contains a number of outstanding pioneering (in 1939) contributions still up-to-date. Among them we like to quote: (a) ”The task to obtain the highest seismic stability in an economical way suggests the correct estimation of the soil behaviour. As *complementary tools* for this purpose we should have available: knowledge on the amplification of the accelerations caused by the variety in the soil conditions on the site for building; seismic activity maps, illustrated with data from seismic catalogues and maps that indicate the geological (soil) risk." (b) "An International Seismologic Union already exists, by the way, founded in 1903 in Strasbourg. However, this does not turn the recommended teamwork useless, because the Union is so overloaded with work that cannot properly undertake to deal with the special problems of interest to the smaller group of countries." (c) "Constructions build up in seismic areas should satisfy the following conditions. Every project should be duly considered, and every construction should be built in collaboration with an *architect*, a *civil engineer* and a *contractor*. The necessary information on the ground acceleration and other issues related to the local seismic activity, should be preliminarily collected from the *corresponding seismological station*." (d)"During *the repairing* it is not enough to make the damages invisible through superficial cosmetic corrections. At least the original resistance strength should be brought back to the damaged spot. Otherwise a fairly light earthquake might cause itself grave damages, as we have recorded." (e) "It is impossible to propose a correct solution of the economical problems in construction, without turning to seismology."

It is thus quite natural to conclude that with his tectonic, geological, geographical, historical, and technical studies concerning earthquakes, August Sieberg dominated this field of seismology for several decades and that his contribution to seismology and earthquake engineering represents an important chapter in the history of science.

Students, researchers, or practitioners, novices and experts alike, will find and profit much from reading this book and having it for reference in the years to come.

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