

THE PLACE OF METEOROLOGY IN THE EDUCATIONAL ACTIVITY OF SZEGED UNIVERSITY FROM 1921 TO 1971

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Zusammenfassung: (*Die Stelle der Meteorologie in der Unterrichtsaktivität der Universität Szeged von 1921 bis 1971* Seit 1921) ist die Universität in Szeged tätig, wo auch der Unterricht der Meteorologie seit einem halben Jahrhundert stattfindet.

Der Unterricht der Meteorologie zwischen 1921 und 1952 war die Aufgabe der Vorträge des Geographischen Instituts. Von 1921 bis 1944 waren die meteorologischen Vorträge mit dem Unterricht der physischen Geographie verbunden und in einen vierjährigen Zyklus eingebaut. Die Vorträge der Geographiestudenten für Meteorologie waren KÁROLY KOGUTOWICZ, GÁBOR SCHILLING, ALFRÉD HILLE, RICHÁRD WAGNER und die Titel der von ihnen angekündigten Vorträge waren Klimatologie, die physische Geographie der Luft, Allgemeine Atmosphärenkunde und Wetterkunde. Von 1945 bis 1952 wurden die teils mit der physischen Geographie verbundenen, teils ganz unabhängigen Vorträge („Wetterkunde, Klimatologie, Geographie des Luftverkehrs, Geographie der Atmosphäre“) und die praktischen Übungen („Geographische instrumentale Übungen,“) von WAGNER gehalten.

Mit ganz selbstständigen Unterrichts- und Untersuchungszielen schied sich 1952 das Geographische Institut II., das spätere Klimatologische Institut aus dem Geographischen Institut aus. Sein Direktor ist Prof. RICHÁRD WAGNER, der auch seitdem die theoretischen und praktischen Stunden der Klimatologie hält. Als empfohlenes Spezialkollegium können die Studenten die Kollegien „Mikroklimatologie, Bioklimatologie (Vorträge WAGNER) und „Die allgemeine Luftzirkulation“ (Vorträge BÉLA BÉLL) wählen in denen die Ergebnisse der theoretischen und praktischen Forschungen des Institutes aufgearbeitet werden. Die Studenten im ersten Jahr nehmen unter der Leitung des Instituts an verpflichtenden mikroklimatologischen Geländeübungen teil; die Studenten der älteren Jahrgänge können Preisschriften und die Studenten im letzten Studienjahr Facharbeiten aus Klimatologie oder Mikroklimatologie einreichen.

Summary: There has been a university in Szeged since 1921, and the teaching of meteorology has also been continued there for half a century.

In the period 1921—1952 the teaching of meteorology was the duty of the lecturers of the Geographical Institute. From 1921 to 1944 the meteorological lectures were related to the teaching of natural geography and were given in a four year cycle. The lecturers in meteorological subjects to the geography students were KÁROLY KOGUTOWICZ, GÁBOR SCHILLING, ALFRÉD HILLE and RICHÁRD WAGNER, and the titles of their courses were Climatology, The physical geography of the air, General meteorology and Meteorology. From 1945 to 1952 the lectures, which were related in part to the natural geography and which were partly totally independent, (Meteorology, Climatology, The geography of aerial transport, and The geography of the atmosphere), and the practicals (Geographical instrument practice) (in the university climate station) were given by WAGNER.

7.) In 1952 the Geographical Institute Number II, later the Institute of Climatology, separated from the Geographical Institute with completely independent teaching and research duties. Its director was RICHÁRD WAGNER, who has held theoretical and practical courses in climatology since then. The students can select recommended special courses from the courses Microclimatology (WAGNER), Bioclimatology (WAGNER) and General atmospheric circulation (BÉLA BÉL) treating the theoretical and practical research results of the Institute. Under the guidance of the Institute of Climatology, the first year students take part in compulsory microclimatological field practices, while the more advanced students and the final year students can prepare course work and dissertations, respectively, from climatology and microclimatology.

In the twentieth century the sciences in general, but particularly the technical and natural sciences, have developed by leaps and bounds. The development is the result of a simultaneously two-directional process: on the one hand it promotes, and even forces the formation of newer and boundary sciences: differentiation; on the other hand, because of its complexity it requires a temporary collaboration or a permanent fusion of related sciences: integration.

This two-directional state is to be found in the case of geography and meteorology, or more precisely climatology. The correct and complete elucidation of certain phenomena and processes and the defining of regularities can no longer be conceived without collaboration. If this common research studies a movement-form which belongs to neither one nor other of the sciences, it may be characterized by individual new regularities, and it may be possible to count on the development of a new method, and later perhaps of a boundary science. At the same time an opposite process also takes place: the two sciences devote great attention to the solution of problems in their own fields which have been studied only insufficiently or not at all, but simultaneously they synthesize in an ever wider sphere.

The slow beginnings of this process could be seen in higher education in Hungary at the turn of the century. It is possible that the importance of collaboration was not sufficiently realized by the specialists at that time. It is a fact, however, that the university students had to attend lectures on climatology in addition to geography. The same requirement was demanded of its students by the Geographical Institute of the University of *Kolozsvár*, which moved first to *Budapest* and then to *Szeged*. Although at first there was no question of the practical realization of the above-mentioned useful principles because of the difficult economic situation following the war, the fitting-out of the university which was only temporary to begin with, and the shortage of suitable teaching staff, shortly after the move to *Szeged* teaching had to be started in 1921 in spite of the unfavourable conditions.

Although there were no suitable lecture-rooms, fittings, or demonstration equipment, already in the second semester of the teaching year 1925—2, of 10 lessons scheduled in the timetable by the Institute, 3 were for „The physical geography of the air” which was the first treatment of a meteorological subject at *Szeged* University. From then on, disregarding a few exceptional years, some member of the Institute gave lectures on meteorology in nearly every year; this is shown by the following list:

1921—2 2nd semester The physical geography of the air.

3 lessons weekly

Lecturer: DR. GÁBOR SCHILLING

- 1924—5 1st semester General geography (Astronomical geography and climatology).
3 lessons weekly
Lecturer: Prof. KÁROLY KOGUTOWICZ
- 1925—6 1st semester The physical geography of the air.
2 lessons weekly
Lecturer: DR. G. SCHILLING
- 1925—6 2nd semester The physical geography of the air
2 lessons weekly
Lecturer: DR. G. SCHILLING
- 1928—9 1st semester Climatology.
2 lessons weekly
Lecturer: PROF. K. KOGUTOWICZ
- 1929—30 1st semester The physical geography of the air.
2 lessons weekly
Lecturer: DR. G. SCHILLING
- 1929—30 2nd semester The physical geography of the air.
2 lessons weekly
Lecturer: DR. G. SCHILLING
- 1931—2 1st semester General meteorology.
2 lessons weekly
Lecturer: DR. ALFRÉD HILLE
- 1932—3 1st semester Climatology.
2 lessons weekly
Lecturer: PROF. K. KOGUTOWICZ
- 1933—4 1st semester Meteorology. Part II.
2 lessons weekly
Lecturer: DR. A. HILLE
- 1935—6 1st semester Rudiments of meteorology and climatology.
2 lessons weekly
Lecturer: DR. A. HILLE
- 1936—7 2nd semester Climatology.
2 lessons weekly
Lecturer: PROF. K. KOGUTOWICZ
- 1937—8 2nd semester The geography of the atmosphere. (For 3rd and 4th year students)
2 lessons weekly
Lecturer: DR. G. SCHILLING
- 1938—9 1st semester Introduction to meteorology and climatology.
2 lessons weekly
Lecturer: DR. A. HILLE
- 1940—1 1st semester Meteorology.
2 lessons weekly
Lecturer: DR. A. HILLE
- 1940—1 2nd semester Climatology.
2 lessons weekly
Lecturer: PROF. K. KOGUTOWICZ

(From the University timetables of 1921—44.)

It can be perceived from the available data that between 1921 and 1945 several fields of meteorology were included in the teaching material. A particu-

lar cyclic character can also be observed in the lectures: a *general eight-semester periodicity*, within which certain studies were regularly repeated. For example the climatology lectures were given in 1924, 1928, 1932, 1936 and 1940, and in all cases consisted of two hours weekly over a period of one semester. In the intervening years the natural geography courses included physical geography and within this general meteorology lectures. Recognition is due to the Geographical Institute for not only recognizing the necessity of, but also putting into practice the teaching of a selected series of lectures on meteorology. In this way it became possible for the students' views to form in many directions in the interest of a given aim, by the presentation of tasks common to the various sciences in the recognition and changing of the geographical environment.

The cyclic character is not only observable in the case of the recurring themes, but also in the persons of the lecturers too. For instance, climatology was always lectured on in the period 1924—40 by KOGUTOWICZ. The physical geography of the atmosphere was taught up to 1931 by SCHILLING. From 1930 the teaching of meteorology was taken over by HILLE. Only on one occasion, in 1937, did SCHILLING again deliver his previous course on the geography of the atmosphere. In 1941—5 no lectures at all on meteorology were announced by the Geographical Institute.

The lectures were announced under the names of senior members of the teaching staff. However, it frequently happened that they were given, either from time to time or constantly, by the junior members. Thus for example, RICHÁRD WAGNER—who in 1930 became an unpaid assistant of the Geographical Institute — at times replaced Prof. KOGUTOWICZ in the climatology lectures; he was also regularly responsible for the courses „Geographical instrumental and mapping techniques” which were held almost every semester from 1930. These practicals had a meteorological connection too: the students became acquainted here, from 1924 in the square in front of the university building, with among others the instruments of the climatology station situated on the roof of the building, and mastered the methods of their handling and use, and at first under supervision, but later independently, took readings with the instruments. They had to study data recording, evaluation and utilization principles and methods. They also took part in small groups in the piloting.

The teaching activities of the Geographical Institute were apparently left out of consideration by a paper which appeared in 1926 in *Időjárás* (Weather) according to which:

„There is still no Department of Meteorology in Hungary, and meteorology is not even provided as an optional subject at the country's two universities. Thus the interest of students can not turn towards meteorology and the qualified teacher-trainees will not be in a position either to foster this interest in the younger generation in the secondary schools, an interest which once aroused would remain no matter to what later career they felt drawn. The committee (the committee of the Hungarian Meteorological Society — NOVÁK) has therefore sent a commission to the Minister of Education to make representations for the early commencement of technical instruction.”

From the above paper and decision of the Meteorological Society can be felt the just concern of the experts due to the neglect of the possibilities of applying meteorology in general in everyday life, and in particular in the teaching in schools. From the text, however, it cannot be decided unambiguously which two universities of the country are referred to in the sentences containing the

condemnation. Nor can it be ascertained whether it was known in Budapest of the courses in Szeged, and if the subject-matter taught in the Geographical Institute was known, whether it was considered to be on a technically suitable level. It is a fact, however, that the lectures listed appeared among the natural geography courses at Szeged University even in the 1920's, and for just this reason the above-quoted finding of the committee of the Hungarian Meteorological Society is in need of correction.

It might be asked whether the Hungarian meteorologists could have had reservations from a technical point of view as to teachers concerned at the Geographical Institute in Szeged. A satisfying answer can be given to the question with the examples of both KOGUTOWICZ and WAGNER. As a young geographer, KOGUTOWICZ became acquainted with research equipment and methods in the meteorological observatory of MIKLÓS KONKOLY THEGE at Ógyalla, where he even took part in the daily work. Hence it can be explained that later, as a professor at Szeged University, he recognized the importance of climatological research on the South Alföld (Hungarian Plain), and did much to create research conditions and to develop varied research activities. The interest towards microclimatology, the newly emerging branch of climatology, might be attributed to the same reason; he had established the research into this in the 1920's.

WAGNER graduated at Szeged. His studies in Budapest in 1928 to learn the theory and practice of piloting formed an important stage in the widening of his technical knowledge. He perfected his knowledge of piloting with GYÖRGY MARCZELL, an internationally recognized authority, whose personality, whose resolute unselfish and self-sacrificing activity in the service of meteorology, and whose attitude of not recognizing an impossible problem, exerted a permanent effect on him. The example of MARCZELL stimulated WAGNER to add to his knowledge constantly, and not to be satisfied with a level of knowledge once attained. The development of these human and research fundamentals ensured a very favourable basis for his later study-trip to the Meteorological Institute in Munich during which he worked for one year with Professors A. SCHMAUSS and R. GEIGER.

All these experiences further increased his thirst for knowledge, and it might be attributed to this that in the teaching he raised the level of requirements to a very high standard, both for himself and for his students. It is due to WAGNER's knowledge and erudition that at his meteorology and climatology lectures the students could become acquainted with the new research results. Thus, for instance, during his studies in Munich WAGNER became familiar with the paper of VAN BEBBER dealing with cyclones, he studied the cyclone theory of BJERKNES, etc. He passed on this knowledge to his students in the period when even well-known Hungarian geographers such as CHOLNOKY doubted the correctness of the findings of the founder and the developer of the theory. WAGNER accepted the cyclone theory and even dealt himself with the study of the routes of cyclones; he published a summary of his research results in 1937 under the title „A ciklonok útvonalai” („The routes of cyclones”).

In an account of the teaching work it is absolutely necessary to recognize the outlooks and ideologies of the teachers. Even in the 1930's, WAGNER declared that a natural scientist and geographer can not be an idealist. He himself acknowledged the principles of materialism, and held it necessary to consider, examine and treat the phenomena during his lectures in their development, in

process, in their relations, and in interaction: He was able to observe that the students could frequently not distinguish between the essential factors and those unimportant as regards the formation and change of the geographical landscape. He therefore defined the geographical factors which are essential and of a deciding nature from the point of view of the geographical landscape. He pointed out from several approaches that the landscape is formed and changes as a mutual effect of these. He stated that as a result of the mutual effects, if the researcher begins his examination of the landscape with the study of any of the factors, he always obtains the same result, and can determine the landscape he is studying by any approach route. The bearing in mind of the above is of fundamental importance in meteorology and climatology. The researcher must conceive and look for the relations between the phenomena, while the teacher has to teach and identify them at all instructional levels. WAGNER undertook to apply his examination method and view formed in connection with the geographical landscape in both the practical and the teaching work.

In the 1930's the teaching work was made easier by essential Hungarian and foreign meteorology and climatology handbooks. The following were in constant use at Szeged University: Zs. RÓNA: *Climate* (volumes 1 and 2) (1907—9); A. RÉTHLY and N. BACSÓ: *Weather and climate, and the weather of Hungary* (1938); the published studies of K. HEGYFOKI; A. HILLE: *The elements of flight, and Aeronautical meteorology*. The more important foreign works included: A. SUPAN: *Grundzüge der Physischen Erdkunde* (1937); A. HETTNER: *Die Klimate der Erde* (1930); A. BERGET: *The physical geography of the atmosphere* (1909); A. DEFANT and E. OBST: *Luftküle und Klima* (1923).

All these technical books were available to the students too, and in the case of WAGNER written lecture notes could also be obtained.

In addition to the acquisition of technical books and journals, the Geographical Institute strived for the constant increase and naturally the constant use of equipment and material of help in illustration. It was attempted to educate the students so that later they too as teachers would continually add to the illustration material. The collection of the Geographical Institute very soon satisfied the requirements of the teachers in both quantity and quality. A large part was played in this by the very widespread international connections of KOGUTOWICZ. The collection consisted of more than 2000 slides, map and picture collections from all parts of the earth; this material was for the geographical teaching in general, but at the same time ensured adequate illustration for the meteorological courses.

The primary object of every teacher in the Geographical Institute was to enable well-graduated geographers to obtain a university diploma in Szeged. Thus the most essential requirement was the fruitful teaching of study material of a suitable standard. The working connections developed of necessity and primarily within the framework of the teaching, but at the same time the possibilities arising from the research work could not be assessed too highly. As has already been mentioned, the *Szeged Plain Research Committee* worked out a comprehensive, complex research programme including climatology among others. This had an effect on the teaching. Thus, for example, while the Geographical Institute tried to meet the expectations of the South Alföld with regard to local weather forecasting, at the same time some of the practical work was carried out with the participation of students. The latter came into contact with the research activity most simply in this way.

It was also important that the students should obtain not only mechanical part-problems but also independent objectives and separate assignments. An opportunity arose for this in the preparation of theses when the students were encouraged to carry out research mainly on the South Alföld. As a result of the above guidance, *the majority of the theses dealt with one or other research problem related to the Plain*. It can be established from the publications of the Institute that *there were some students interested in climatology*. Thus, it can be found for example in the KOGUTOWICZ memorial volume that KÁROLY LADÓCSY and IRÉN VÁRADY wrote studies of the climate of Kaposvár, and the rainfall conditions of Sub-Carpathia, respectively.

Mention must be made here of the characteristic attitude, the effect of which was reflected in all local publications with the exception of the Institute journal *Acta Geographica*. In WAGNER's opinion a place had to be given to the studies of the students among the publications of the teachers and researchers. The students were encouraged by this gesture: they were happy that even as beginners they could appear among the well-known, and they further felt it their duty to prove that they deserved this trust. The idea and the practice gave many students a taste of scientific work, and this may be the explanation of why so many of the geographers who finished their studies in Szeged became internationally recognized authorities and outstanding researchers in the fields of geography and biology. *For the students the already mentioned initial possibilities were provided by the publication „Földrajzi Szeminárium” [Geographical Seminar,] which appeared unfortunately for only two years.*

Having referred to the Földrajzi Szeminárium, in this context we must deal with the further teaching and at the same time human connections between the lecturers and the students; these likewise played a great part in the development of the effective work of the Geographical Institute. For instance, a data sheet was prepared on every student in the Institute; this reflected the results obtained in the examinations. On these sheets were not only the marks but the comments of the teachers on the abilities, etc. of the students. At examination time the personal sheets were with the examiner who knew in advance what he might expect from a candidate, while the latter had an idea of what achievement he might attain; perhaps the most important feature of the system was that the teacher could in advance prepare himself for the most effective method by which the student could be assisted as far as possible to reach the highest standard within his capabilities.

Also on the student-sheets appeared the schools, research institutes or other places where the students went after obtaining their diplomas. As a result of the good human relations formed with the teachers at the Institute, the ex-students considered it natural to return to Szeged from time to time or regularly, to talk about their work, to seek and if possible obtain help in the realization of their ideas.

A new possibility to publish was provided to the university teachers and students by the twentieth anniversary in 1939 of the start of KOGUTOWICZ's university teaching career. The *Kogutowicz Károly emlékkönyv (Kogutowicz memorial volume)* which appeared then was prepared and published mainly with the support of students and ex-students.

In addition to the aforesaid, unimportant seeming threads also had a part in the strengthening of the professional and human connections. Among these for instance were *the exhibitions which were organized fairly regularly by the*

Geographical Institute. These exhibitions in general gave an account of the results of the research on the Alföld, and among these of the climatological studies. The necessary documentary material, figures, sketch maps and graphs were prepared and arranged in the main by the students.

The second world war caused a severe break and setback in the development which had lasted for nearly a quarter of a century. The cyclic lecture-series were interrupted, the valuable books and journals, the equipment, the notes, and the results of the collecting work of many long years were all destroyed and lost.

Due to the consequences of the war, the teaching work of the Institute could begin again only in March, 1946. It is characteristic of the situation at that time that all of the teaching staff were crowded together into the one room which could be heated.

A change also took place in the leadership of the Institute. KOGUTOWICZ left Hungary at the end of the war and as his successor was appointed Prof. GYULA PRINZ, a geographer who was well known in Europe and an Asian explorer. The new leader of the Institute had previously not dealt at all with meteorology, but he considered that lectures in this subject were necessary. It was obvious to him that such lectures should be given by WAGNER. With this distribution of the work the teaching of geography students began again after the war.

In the initial period mainly the previously thoroughly elaborated climatological manuscript material was missed, but the collection of new material was set about at once. The landscape theory built on the interactions of geographical factors was published only years later (WAGNER, 1956). In Szeged circles his above study was accepted as the first Marxist theoretical geographical study.

After aeronautical geographical and settlement geographical studies, in 1950 the microclimate research which had been begun before the war was restarted in the Geographical Institute.

The questions of the research themes have been mentioned in some detail because they were closely related to the lecturers. In the teaching year 1947—8 the number of courses given was increased to include „Meteorology”, „Climatology”, „The geography of aerial transport” and „The geography of the atmosphere”.

The working conditions are demonstrated by the fact that, depending on the least demonstration material possible, the teaching had to be done with the absence of otherwise indispensable practical work. Due to the war damage, it was only possible to depend on the possibilities provided by the climate station moved to the roof of the university building, and this was substantially more modestly equipped than the previous one.

Meanwhile the source material necessary for the teaching was collected together, including F. KLUTE: *Handbuches der Geographischen Wissenschaft*, and in 1951 WAGNER compiled notes under the title „*Meteorology and climatology*” for the geography students, in which he relied on the material of the above-mentioned work.

By 1952 the damage and deficiencies caused by the war had been made good in the most essential points, relatively varied teaching activity had been developed, and the first experimental specimens of the microclimatological research equipment and instruments had been designed and made. At that time too, the conditions of

a major change had already been decided on; this was to be a turning point in both the teaching and the research work. The change was not delayed, and in 1952 the Geographical Institute Number II separated from the mother-institute.

The teaching of meteorology in the Institute of Climatology

With effect from 15 August 1952, WAGNER, who was appointed professor in the same year, was commissioned to establish the new Geographical Institute Number II. This name was not long-lived, and from September 1953 its final name became the Institute of Climatology.

The thirty-year old Geographical Institute and the Institute of Climatology have since then carried out teaching and research activities on the basis of the previously decided division of work. In addition to meteorology, the Institute of Climatology also received the task of teaching astronomical geography, mapping and projection. Besides these, the Institute of Climatology also carried out the teaching of some other courses up to 1957, when a final decision was made as to where certain subjects belong („Introduction to geographical science”, „Topography” and „Biogeography”).

The Institute's main research theme, microclimatology, received at first a slight, but later an increasingly large importance. Among others it is due to this latter fact that it became the task of the Geographical Institute to teach the temporary subjects, and the ratio of lectures more in keeping with the initial objectives of the Institute of Climatology increased. Such a course is „Climatology” which is given to the first and second year students in two lessons weekly, generally during two semesters; this course has been taught since 1952. In the teaching year 1954—5 the second year students could take microclimatology as a recommended special course in three lessons weekly, and from 1959—60 in two lessons weekly. From the second semester of 1959—60 the second-fifth year students could take bioclimatology as a recommended special course in two lessons weekly. The lectures listed above have been given by WAGNER since 1953. From the second semester of 1963—4 the sphere of recommended special courses was further widened by „Microaerology”, delivered by BÉLA BÉLL, director of the Aerological Observatory at Pestlőrinc, and soon afterwards a professor at Szeged University, in a total of ten lessons. From the second semester of the following year he gave lectures twice weekly on „The general circulation of the Earth's atmosphere”, and then on „General atmospheric circulation”. BÉLL became connected with the direction of the production practice of the students, and in 1959 he led the microaerological practicals for the first year biology-geography students.

Microaerology has obtained a role in the research work, and such studies have continued in Szeged since 1965. In connection with the group of themes mentioned, the Institute of Climatology has set itself the aim of elaborating the aeroclimate of Szeged. This research theme exerts an effect on the teaching work too; some of the students can specialize in this field and can deal in their theses with questions of the aeroclimate of Szeged. It can be stated unambiguously from the above that BÉLL's joining into the teaching and research work was a great gain for the Institute of Climatology.

Mention must be made here of further past and present teachers and researchers of the Institute of Climatology. As was mentioned earlier, in the be-

ginning WAGNER alone held all the announced lectures and practicals. Later, as a result of a planned staff development he could share his duties with more and more teachers and researchers. ÉVA BENEDEK, JÓZSEF MÁTYUS SZOLÁN, MIHÁLY ANDÓ, ÁKOS NOVÁK and JÓZSEF BOROS took part in the theoretical and practical climatology teaching, in the field work, and in the research activities connected with these; BOROS is still on the staff of the Institute. ÁRPÁD KISS is the lecturer in astronomical geography, and also participates in the research. In turn, ZOLTÁN WISCHÁN, LAJOS TIMÁR, IMRE HORVÁTH and ILONA K. BÁRÁNY have also collaborated in the research work; these four are biologists, and naturally their research themes were in accordance with this. BÁRÁNY is at present continuing her work in the Institute.

A high level is established for the students by the requirements of practical life, the continual increase of the teaching standard in schools, and the teaching demands of the Institute in meteorology and climatology. This is supported too by the experience of meteorology teaching during half a century, and in the end the present teaching material was shaped by these many components. Although the present teaching time is very limited (the number of lectures varies from one to three weekly per semester over one and a half years), with the stressing of the essential parts and the training of the students to perform independent work it has been possible to attain a state where the necessary material can be passed on to the students by up-to-date methods. The aim to be reached during the teaching is very concisely defined by the latest subject guide as follows:

„... the teaching of the phenomena and regularities of the climate, and the demonstration of an interaction connected with the other geospheres.”

The aim of the practicals, in close relation to the theory, is:

„... an account of the more important meteorological instruments, illustration of the methods of elaboration of meteorological data, independent measuring, instrument handling, setting up of stations and instruments, independent elaboration of the experimental data.”

During the lessons the students receive a historical survey of the development and tasks of meteorology, get acquainted with the necessary concepts, learn about the atmosphere, its phenomena and processes, the elements of the climate, and the classification of the climate, and master the fundamentals of microclimatology. In the practical work they become acquainted with methods of data collection and elaboration, relying on the traditional and most developed techniques. All these, together and separately, serve the practical teaching interests, and render it possible that during and outside the teaching, as far as the given possibilities allow, the knowledge should be used for practice (*Guide*, 1970).

Since 1955, after the end of the teaching year the first year geography students have had to study, among other things, the the equipment and methods of microclimate research on a 2—3 week *field practice*. The Institute has recently created a *link between the field practicals and the research aims*, such that the field practicals are held in some research area. Thus, to a certain extent the research depends on the work of the students. In this case of course allowance has to be made for errors arising from their inexperience, but it can be stated that as a result of the conscientious preparations by the staff of the Institute the students produce completely satisfactory results after a relatively short training period.

The teaching handbooks have already been mentioned, but it is still necessary to deal with the studying conditions of the students and the available publications of a textbook mature. The notes compiled by WAGNER in 1951 went out of print shortly after their preparation. The difficulties were ironed out by the first volume of the textbook „*General natural geography*”, in which climatology was treated in accordance with its importance. At the beginning of the 1960's and latterly in 1968 there appeared the commonly written notes of BERÉNYI, DOBOSI and WAGNER entitled *Climatology*. In addition the library of the Institute is available to the students; this contains both the older, historically important and the latest research results, together with the continually expanding journal-material from all parts of the world. The deepening of the students' knowledge of the subject, and the development and raising to an adequate level of their practical abilities is assisted not only by the production practice but also, within the teaching framework, by their acquaintance with the work of a climate station, and often by their regular participation in the observation work outside their normal training: the preparation for processing from several viewpoints of data obtained during microclimate investigations, etc.

Every teacher of the Institute of Climatology feels it his duty to develop multiple connections with the students and to strengthen them consciously. In the Institute of Climatology the geography student can study outside the teaching time, and can join in the research activity; since the teaching year 1960—1 he can present as course work his research results (which may be of scientific value) obtained in directed or independent work in the fields of climatology or microclimatology. These favourable possibilities and also the field studies in the summer period (in which the students can similarly take part) have encouraged several ambitious young students to prepare doctoral dissertations after obtaining their diplomas. It is possible to attribute to these relations the phenomenon, which has now become practice, that the majority of the teachers in the Institute received their professional start from the leader of the Institute as young students, and as a result of this themselves work in the Institute of Climatology as university teachers and researchers.

It must be mentioned in connection with questions of the teaching in what teaching forms and for the students of which subjects lectures are given by the teachers of the Institute. The teaching forms are the following: in the day classes the students who have successfully completed their secondary school education attend the lectures in the full number of hours. In the correspondence classes teacher trainees who are not in possession of university or professional graduation certificates can obtain teaching diplomas by attending a smaller number of classes, but by satisfying the same examination demands as the day students. *Up to 1950 the geography students belonged to the Arts Faculty, but since then to the Faculty of Sciences.* Since 1952 the pairing of the students' courses has changed on several occasions as follows:

- to 1955 geography — geology
- from 1955 to 1957 geography — history
- from 1955 to 1965 geography — biology
- from 1966 geography — mathematics

In 1955 there were simultaneously two types of subject-pairing. At that time, for the second year geography-geology students the place of geology as second subject was taken by history. In the same year, on the other hand,

the first year students began their studies with geography-biology. Up to 1957 the courses lasted for four years, and since then for five years.

In the correspondence classes there are one-subject (geography) and two-subject (geography-biology) courses. Depending on the previous qualifications of the students and on whether the courses are one- or two-subject, the studying time can be two, two and a half, three, four, five or six years. The correspondence students attend lectures on climatology and take part in climatology practicals in the first year.

Recapitulation

The jubilee volume summarizing the results of the *National Meteorological Service* attained in Hungary over one hundred years (*Chapters . . . 1970*) confirms with very rich material the very high scientific importance of that work. Since it surveys primarily the development of the national institute, it can understandably only touch upon the Institute of Climatology in Szeged and its predecessor and their relevant research activities. This is even truer for the teaching work. It can be read in the above volume of the separation from the Geographical Institute „ . . . of the Institute of Climatology of Szeged University, led by Prof. RICHÁRD WAGNER.” Then later there is: „ . . . all three university institutes are in connection with the meteorological service.” These few sentences can in no way give a complete factual account, and still less of course an evaluation. It has been attempted to make up for this deficiency with a survey of the past fifty years of meteorology teaching in Szeged University.

Looking back over the last half century it can be stated that the meteorological studies beginning from the first years of the operation of the university in Szeged before the second world war, but mainly after the formation of an independent Institute of Climatology, have provided fundamental knowledge to several hundred geography students, helped in the demonstration of the links with related sciences, and have given valuable support to a number of students in the beginnings of their scientific careers. What was previously strived after with the initial results was completely achieved from 1952 in the joining of the theory and practice, and in the totally responsible carrying out of teacher training. Although the teaching aims twice had to be attained starting practically from scratch, the tremendous efforts and the diligent work brought the desired result.

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