Triassic limestone-outcrop is known, both effects can be assigned to such. On the other hand, it is not impossible, that an inversely polarised volcanic rock (at Bár, Cretaceous diabase is exposed) is responsible for the gravity maximum and magnetic minimum.

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The overall picture furnished by the magnetic survey is – in consequence of the mentioned station-spacing – (except the northern overthrust belt) a reconnaissance one, and obviously bears the marks of sketchiness. If studying how and to what extent should it be improved in the future, the following are to be stated:

1. for the two most important minerals ot the region (the Permian sandstone and Lias coal), the magnetic method cannot offer direct information. Neither can it do this for minerals of smaller significance (e. g. limonitic ore).

2. The basin extending between and around the two mountains is of a structure similar to the other parts of the Hungarian basin, only shallower, i. e. it is built up of a variable floor and of a Neogene cover-formation. The geomagnetic coverage of these basinlike areas is adequate for our present reconnaissance monography. But magnetic survey plays a substantial part in detecting the susceptible constituents of the crystalline basement, thus considerable tasks are still waiting for magnetic survey of detailing character.

3. The diabase (phonolite, andesite) of the Mecsek mountains as well as the possible magnetite-occurrence set direct tasks before the magnetic detailing survey; possibilities of this kind are not exhausted yet at all.

Summing up: in the future, the region claims only detailed magnetic survey upon certain special areas, i. e. upon the areas of anomalies indicated by the reconnaissance survey. These are: the basic parts of the crystalline basement and the basic volcanic rocks. The magnetite question is not decided either.

The detailing survey is in progress at present. Its results will be published later.

The geomagnetic survey raises a number of methodological problems. Such are, e. g. paleomagnetism, the relation of induced and remanent magnetization in the rocks of different age and origin; and accordingly the correct determination of disturbing bodies.

33 THE MAP OF THE PRETERTIARY BASEMENT (THE BASIN-FLOOR) OF THE MECSEK- AND VILLÁNY MOUNTAINS

(suppl. 2)

In preparing this map, several geophysical methods shared parts; also drilling-data were taken into consideration. For this reason, before commenting the map, a few words are due about the joint application and correct geological interpretation of the geophysical methods, termed in the everyday usage: complex investigation.

In the foregoing chapters, the principles and sphere of application as well as the specific releases of the single geophysical methods were defined. It was mentioned several times, that the reliability of interpretation is higher if supported by the data of more than one geophysical method and geological knowledge.

Now we are going to study the geophysical methods, how they can be inserted into a complex.

The change of the gravity field – as pointed out – reflects the lateral change either of the relief or of the petrographical composition of the basin-floor. In the first case, depth-measuring methods or drilling data can supply such correlation curves which change qualitative gravity information into quantitative one, and thus quantitative data (seismic, geoelectric, drilling) can be extended far beyond their usual coverage.

If the floor-relief is known, an unparallel course of the gravity field suggests a lateral lithological change, i. e. a change in the thickness of the disturbing body.

The change of the geomagnetic field geologically refers to the following facts:

1. the parameters (depth, petrographical change) of the basic constituents of the crystalline basement;
2. basic volcanic rocks;
3. tectonics accompanied by volcanism;
4. magnetitic ore-deposits.

In our region all these can occur within or below the basin-floor.

The geomagnetic method can form a complex couple, first of all, with the gravity method. The joint application of both can decide in itself in several petrographical problems. In case of a simple geological structure and using proper station-spacing, both methods are suitable to calculate the depth of the disturbing bodies.

Also the geoelectric method can complexly complete the geomagnetic method in determining the depth of the disturbing body. It was stated, namely, that the magnetic bodies exist usually in the basin-floor or below it.

The seismic refraction method can play an identical part (the determination of the depth of the basin-floor).

Geoelectric and seismic refraction methods have essentially identical tasks:

1. the determinaton of the thickness and lithological composition of the young Tertiary formation filling up the basins;
2. the determination of the depth, topography and lateral petrographical changes of the basin-floor (this – indirectly – can be regarded as a structural, so-called morphotectonical information).

It is easy to comprehend, that the determination of the thickness of the young Tertiary cover is a task identical with the determination of the depth (topography) of the basin-floor. The latter can be solved only, if the vertical change of the topography exceeds the resolving power of the given depth-measuring method. Seeing from this view, the geoelectric and the seismic refraction method may differ. The difference depends upon the local dimensions and on the local distribution of the respective physical constants. In fact, seismic velocity depends on lithological composition not the same way as specific resistivity does. Therefore, these two equally depth-measuring methods can complexly complete each other. On the other hand, the numerous analogies of the principles of application allow a completing (sometimes replacing) application of these methods.

In complex investigations, the single methods are not applied at random, but in the planned, systematic process of the exploration, the rate of the individual methods changes from stage to stage. These stages are: 1. the regional, 2. the reconnaissance and 3. the detailing stage.

From regional to detailing stage, densifying (of the nets or stations), detailing, the predominance of the detailing kinds of methods show up more and more. The principles of this were fixed up by the geophysical commission of the Council of Mutual Economic Aid (**11,1964**). These principles – *mutatis mutandis* – apply to our region, too.

In the regional stage, gravity and magnetic methods have dominant part. In our region, in this stage, it must be decided (by a rough qualitative denotion), where is "up", where is "down" (in the relation of the basin-floor), and where are rocks of susceptibility. A depth-measuring method (seismic, geoelectric) can be bestowed, in this stage, with the only task of checking (in a few points) the correctness of the "ups" and "downs" indicated by gravity. Such density of network is to be striven for, as allows a representation in a scale 1 : 500 000.

In the reconnaissance stage, the stations of the methods of qualitative character (gravity, magnetic) are to be densified to a scale of 1 : 200.000 or 1 : 100.000, and depth-measuring methods (seismic, geoelectric) come into the foreground. The profiles of the latter are directionally located by taking the evolving gravity pattern into consideration. These are long 4 – 5 km distant profiles crossing more than one structural indication. Their results (in our case: the basin-floor) can be represented in a scale 1 : 100.000. The coverage of our region corresponds to this stage.

In the detailing stage, the gravity method scarcely gets part (if so, mostly in local, so-called "micro" programs), also the magnetic survey concentrates on detailing the local indications. Depth-measuring methods are predominant. In case of oil-prospecting, now comes the turn of detailing the previously indicated structures. A prospecting of such character was performed around Sellye and Szigetvár. But, in the region, oil is of secondary importance; depth-measuring methods can be entrusted to determine the details of the relief and the petrographical changes of the basin-floor, considering always the drillings finished in the meantime. This is a rough sketch of the future investigations, too.

Today, however, certain parts of the region are already in the detailing stage, at least as to one or another method. Such is the magnetic coverage of the northern overthrust belt and the southeastern margin; further, geoelectric and seismic coverage is on certain places (e. g. Mecsek southern margin) in or near the detailed stage.

Of course, to think this system to have prevailed unbrokenly from the beginning of the exploration, would be a rather false belief. It did not prevail and could not either, because three organizations shared in the exploration, imperfectly coordinated. Moreover, the views and principles of complex investigations have been established exactly in the course of the activities. The theoretical results obtained this way are published in this paper, but, of course, the geological results are regarded as most important. These results are represented on the geologically interpreted complex basement map (suppl. 2) based upon different geophysical investigations.

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The basement map includes geophysical and drilling (geological) data. A considerable part of depth data were obtained by geophysical measurements; the qualitative definitions are due, in the first place, to drilling data. The arrangement of the strips was backed by geophysical considerations; the isolated drilling data were geophysically extended in the represented way.

While in Fig. 9 and suppl. 1 exclusively gravity, resp. geomagnetic results are represented, suppl. 2 is based predominantly upon seismic (refraction) and geoelectric work, i. e. upon depth-measuring methods.

Seismic refracion measurements made by the HSGI 'RL' started in 1953 and finished in 1962. From 1962 on, also the MOMC have performed seismic refraction work, it is in progress even today. On the SW part of the region – in the vicinity of Sellye and Szigetvár – NOGT made seismic refraction and reflexion measurements in 1959 and 1960.

The Geophysical Institute used Hungarian made originally reflexion truck-mounted equipment of the SzM–24–52 type (24 channels) fitted for refraction requirements. MOMC have operated with a similarly Hungarian made 24 channel portable apparatus. NOGT used a Hungarian made 26 channel truck-mounted and a 24 channel portable instrument, further a 24 channel (type 51) Soviet-made truck-mounted reflexion equipment.

The principle, the methodology and the system was on the whole identical in the measurements of all the three organizations. Its essential character: the predominating rate of in-line shooting (reduced quantity of broadside shooting). As to the density of the profile-net, the HSGI 'RE' program can be regarded more of the reconnaissance, that of the MOMC and NOGT, reconnaissance and detailing kind. The profile-net is represented on Fig. 12, a seismic profile with its complex preceding events (Δg, ΔZ), on Fig. 13.

In the beginning, first arrivals were used, the field procedure was fitted to this. Later on, advantage was given to CRM (correlation system of refraction work). Interpretation was and is made with the widely known simple procedures (break-point, intercept time, time-control, wave-front).

The major part of geoelectric measurements were carried out by the MOMC from 1958 on, with a Soviet-made field potentiometer EP–I type. The system of measurements was VES, with a maximal electrode spacing of 3000 m.

The specific resistivity curves underwent both qualitative and quantitative interpretation. The main point of the former is the izoohm map and the grouping of characteristic curves. In the course of the quantitative interpretation, local figures for the specific resistivity and depth-points were determined, with the aid of two- and more layer curves. Of these, geoelectric profile-sections were prepared. Such one is represented, together with its complex preceding events (Δg, ΔZ), on Fig. 14. The entire profile-net is shown on Fig. 15. The geoelectric profiles served as basis for preparing the depth-maps. The latter were employed in preparing suppl. 2.

Telluric measurements were carried out by the HSGI 'RE' in 1961 with a T–9 GMGy factory made and two own-made equipments. The measurements and the calculations followed the usual way. The izoareal map of the telluric survey was applied to check up, and correct the seismic relief-map on the SW part of the region.

Suppl. 2 is a complex map of the basement, the floor of the young Tertiary basin. Several reasons urged to accept this horizon as datum-horizon. One of these was the connection of the minerals to it or to its subsurface. Further, Nature herself directed our attention to this horizon since, of all possible stratigraphical horizons this one is enhanced by the distribution of the physical constants.

The floor of the Neogene basin: this is the realistic aim of the investigations. The lateral stratigraphical and petrographical arrangement of this will be detailed in the following as deeply as allowed by the complex investigations carried out till now.

The structure of the basin-floor of the region can be roughly characterized by the statement, that – proceeding from the north to the south – five different basement-strips can be distinguished in it. The strips are separated, in general, by E–W and NE–SW tectonical lines. The five strips are as follows:

1. crystalline basement north of the Mecsek;
2. the Permian–Mesozoic strip of the Mecsek itself, with an exposure of the fundament-granite on its western part;
3. the South-Baranya crystalline ridge and the Mórágy granite-area;
4. the Permian–Mesozoic strip of the Villány mountain;
5. the presumably metamorphic strip south and southwest of the Villány mountain.

The strips are bordered, on the west and east, i. e. on the southwest and northeast resp., by crossfaults of approximately transverse direction. The "termination" of the Permian–Mesozoic strips, on the west or southwest lies near the boundaries of the region; toward east or northeast, the strips cross the boundary of the region. Transverse (i. e. abt. NW–SE striking) tectonical lines can be recognized within the individual strips, too. The importance of such, is secondary as compared to that of the main ones, but not negligible.

Strip 1 is represented, on our map, only with its southern part. Its tectonical boundary to the strip 2 – between Szulimán and Ibafa – was drawn according to seismic, geoelectric (relief) and gravity (course of the Bouguer anomalies) considerations. For drawing the section between Bakóca and Liget, only a single refraction profile (KáR–1) stood at disposal, therefore also Δg/H calculations and the known Miocene tectonics were needed to denote the course of the section. The further section of this tectonical boundary – between Magyaregregy and Nagymányok – is known for long in geological literarure as the "northern overthrust belt".

The tectonical feature NE of Mecseknádasd was composed on the basis of seismic (relief) and geological considerations.

The eastern boundary of the strip 1 is geologically drawn so as represented.

The petrographical composition of the strip 1 between Kadarkút and Gálosfa is scarcely known. The value and course of the gravity and magnetic anomalies, in addition to the seismic velocity (4000 – 5000 m/s), does not contradict an assumption of metamorphic floor on this area. The geological survey made it clear, that the material of the Permian sandstone was transported to its present site the from north. This corroborates the assumption. The material of the Permian sandstone suggests a metamorphic and granite area of erosion. The (Szalatnak type) Silurian gravel in the Lower Permian, and the quartz-porphyry pebbles of the entire Permian allow the assumption that a thin Silurian may have existed in the area. Of this, however, only traces may exist nowadays at most.

Also the occurrence of Permian, and what is more, of Middle Triassic (Anisian) traces, having survived erosion, is not unimaginable. Upper Triassic and Jurassic are, however, not probable.

In the vicinity of Liget, the crystalline uniformity of the strip 1 is interrupted by a strip of Middle Triassic limestone (1b). According to seismic and geoelectric data, its surface is rather featureless; the whole – slightly sunken – mass mildly leans from WSW towards ENE. On the NE and SW, it is bordered by cross-faults; the former is more pregnant. Apart from geophysical data, this is proved by the granite at Szalatnak found in – 500 m, while at Liget, Anisian limestone lies in – 1000 – 1200 m.

E of the area in discussion is the Szalatnak – Györe block, where the basin-floor is disclosed by numerous drillings. On the western, higher part of the block, the immediate fundament of the Neogene is Middle Triassic (Anisian) limestone, unfolded. Underneath, Lower Triassic and Upper Permian sandstone follow, similarly unfolded. Further down, folded Silurian clay-shale follows, underlain by granite. It may be, that also on the eastern – deeper – part of the block, Triassic, incidentally younger Mesozoic forms the immediate basin-floor, but also unknown Paleozoic or Proterozoic rocks may exist (see e. g. the granite at Szekszárd). No qualitative determination was allowed by the geophysical interpretation, the relief data of the floor are, however, rather reliable. The eastern boundary of the block is indicated by a sudden change in the topography of the basin-floor.

The strip 2 is, in fact, the Permo – Mesozoic range of the Mecsek mountains. Its greater part is exposed to the surface, its western end (strip-spot 2a) is, however, covered by Neogene sediments. The 2a, upon which a number of geophysical measurements were carried out, acted more rigidly than the main bulk of the 2; it answered to tectonical forces with faults. It is divided into four blocks. The block-mosaic of Csertő is relatively sunken. The depression is filled up by Permian sandstone. Seismic refraction measurements indicated a boundary of high velocity in a depth of 1000 m from the surface.

The geoelectric survey caught a high-resistivity horizon at about 300 – 500 m from the surface. It may be assumed that seismic shooting found the granite basement as refractor, while the immediate basin-floor (Permian sandstone, here) was determined by the geoelectric survey (Fig. 16).

Similar phenomena were observed elsewhere too – e. g. at Szilágy, Martonfa, Ellend. The relief-map of the basin-floor of this place is based upon electric data.

In the block-mosaic Ibafa, the basin-floor is built up of Lower Permian sandstone, quartzporphyry and (on the south) serpentine. The latter is indicated by magnetic anomaly too. The anomaly suggests a considerable extension of the serpentine body, the question, however, – whether the serpentine creeps below the Permian anticline of the western Mecsek or not – is left open.

The main bulk of the strip 2 – as mentioned – is the Permian – Mesozoic range of the Mecsek, exposed to the surface. Its northern boundary (southern of the strip 1) was just described. On the south, it is delimited by a large overthrust belt, which, beginning at Szigetvár, runs through Pécs until as far as Ófalu, and is well-known from numerous geological data of both drillings and daylight. Along this plane, even recent movements have taken place in consequence of which, the Lower Pannonian formations were, here and there, overthrusted by Permian – Mesozoic strata.

This tectonical line must have existed and been alive formerly too, because e. g. in the vicinity of Szilágy and Martonfa only Upper Permian (Jakabhegy facies) sandstone is known; while in the Mecsek the whole series of the Permian exists. Further: Upper Carboniferous is reported only from the strip 3, there is none, however, in the underlying of the Mecsek Permian.

The strip 2 is terminated, both on the west and on the east, by a big fault.

Not much is to be accounted about the Mecsek mountain itself (in the topographical sense of the word). According to our basic principles, the very terrain for the investigations begins there, where the outcrop of the older (than Tertiary) rocks (i. e. the morphological mountain) ends. We take the liberty to remind of the introduction, where it was mentioned briefly, that the outcropped strip of the mountain on the west is tectonically composed of an anticline, and on the east, its predominant tectonical element is a closed syncline.

The tectonical line separating the two main elements is a continuation of the aforesaid one, separating the Liget and Szalatnak blocks in the strip 1. The Miocene andesite of Komló broke through the Mesozoic at the crossing of this and a main one. There are conspicuous magnetic anomalies on this area, but Miocene volcanism cannot be separated from Cretaceous one merely upon geomagnetic considerations.

The strip 2 is cut, on the east, by the already mentioned cross-fault at the edge of the big Neogene depression of Cikó – Bonyhád (see: Miocene lignite of Hidas); on the south, i. e. southeast, by the great overthrust belt of the Mecsek, which starting at Szigetvár (at the boundary of the strip 5) and running through Pécs crosses the boundary of the region.

The northern-northeastern boundary of the strip 3 (the South Baranya crystalline ridge) is the southern-southwestern boundary of the strip 2 just described. Far more difficult to delimit it on the south, since its progress of development was much similar to that of the strip 4. It is obvious, however, that north of the Kisdér – Bátaszék line, the basin-floor is generally crystalline, while south of it, the basin-floor is composed of Permian and Mesozoic sedimentary rocks.

The strip 3 can be further subdivided. Northeast of the Pécs – Bátaszék line, granite, southwest of it, crystalline metamorphic rocks and Upper Carboniferous rocks occur. At Gyód, the serpentine drilled coincides with a magnetic maximum which is accompanied by a minimum. The magnetic anomaly can inform only about the strike of the serpentine body. Between Szigetvár and Pécs, a rather complicated zone is to be assumed as a continuation of the southern overthrust belt of the mountains, – consisting essentially of granite and crystalline rocks.

In the area of the Ellend basin, the gravity values in the whole, agree with those of the far shallower Turony – Újpetre area, where the basin-floor is built up of thick Permian overlain by a slight Mesozoic. Rather surprisingly, the density of these Permian and Lower Triassic clastic rocks must come close to that of the Neogene rocks, that means that a (seismically or electrically det.) deep floor and great anomaly never indicates Permian sandstone, while shallow floor and small anomaly on this area indicates Permian sandstone.

It is worth mentioning, that at Téseny, Upper Carboniferous shale and sandstone is known.

The northern boundary of the strip 4 is the uncertain southern boundary of the previous strip, i. e., with a rough delineation, the Kisdér – Máriakéménd – Monyoród – Bátaszék line. Its southern boundary is the NW – SE striking tectonical line separating it from the strip 5.

In the vicinity of the Villány mountain, in the Monyoród – Bár range, the basin-floor is formed by Mesozoic (Triassic – Jurassic – Cretaceous). This large massive block is tilted over to the east; on its western part, also Lower Triassic and Permian formations occur in the floor of the basin.

The geophysical coverage of this area is far from complete, even if related to the reconnaissance stage. East and south of the Villány mountain, in fact, there are no data whatever, obtained by any depth-measuring method. Also drilling is scarce.

The southern termination of the Villány mountains is completely undiscovered as yet. It must be cut off by the northeastern boundary of the strip 5, and further to the south, crystalline formations build up the basinfloor.

The Villány mountain is nothing else, than an overthrust belt in itself, and is continued buried under the Neogene as far as, i. e. no farther than, until the floor-relief suggests elevated blocks. The range crosses the Danube-line and is supposed to continue towards Kunbaja and Madaras (outside the region). To the southeast (Beremend), under the Neogene cover, there are Cretaceous (carbonate) rocks, folded, overthrusted, i. e. resembling of the Mecsek.

The strip-mosaic Újpetre – Mohács – Kölked reveals a pattern similar to the western Mecsek. Its general structural form is an approximately W – E striking large anticline of an east-plunging axis.

North of this mosaic is situated the Máriakéménd – Dunaszekcső – Bátaszék triangle, where the basin-floor is, in overwhelming majority, composed of Middle Triassic limestone. On its northern margin, terrestric Upper Permian is settled upon the granite reported from the strip 3.

The relief of the basin-floor – assumably the entire structural pattern – seems to be rather quiet, mild folds and faults occur.

On the east, the strip 4, too, is terminated by the tectonical boundary referred to several times.

The strip 5 can by no means be termed either Mecsek or Villány mountains, because it is nothing else than a huge tectonical depression, dipping southwestward. The valley of the Drava river indicates this tectonical feature rather well.

Seismic exploration for oil was carried out on this area, having indicated a basin-floor of varying velocity-conditions.

The velocity of the "seismic" floor, i. e. the seismic velocity-range of the basin-floor, varies between 4300 m/s and 6000 m/s. This indicates – in first approximation – a variegated pattern of rocks. In fact, however, the basin-floor was tested by drilling and elementary geological considerations to be uniformly crystalline or perhaps of Upper Carboniferous rocks. The changes of the seismic velocity may indicate not so much facies or petrographical changes, as different depth. At any rate, the highest velocities can be ascribed to crystalline rocks, medium velocities in medium depth, mostly to granite or Upper Carboniferous, and lower velocities (within the given range) in relatively great depth can be interpreted as belonging to some lower horizons of the Neogene basin-formation (i. e. not to the basin-floor). For this reason, to the depth-data furnished by seismic survey in these places, 200 m were added.

Only the northeastern tectonical boundary of this strip is known. The others are outside the region, even beyond the borders of the country.

The character of the tectonical lines bordering the strips, changed several times during the history of the Earth, according to the direction of the tectonical forces. The details of these processes are, in most cases, unknown. Best discovered is the Szigetvár – Pécs – Ófalu so-called "Mecsek-foot" line which was developped before the Permian as a fault, and functioned after the Pannonian, as an upthrust zone.

In the intervening period, its role is uncleared, only its facies-separating part is obvious. This is the most important paleogeographical significance of all tectonical lines, too, bordering the other strips.

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Thus far extends our present overall knowledge concerning the region. The monography was designed so as to furnish the reader with a rough idea also about the further tasks.

In the sense of the introductory words of the last chapter, further tasks can be summed up thus: to develop the coverage until the detailed stage and to introduce new methods.

The informations expected of geophysical exploration always have been and will be restricted by the considerable overlapping of the physical constants of the rocks of the region. Consequently, there is a rational limit to the densification of the survey-net. Nowadays, the rational limits are still far from being reached.

The detailing measurements – according to the present ideas and under the present technical conditions – are confronted by the following tasks.

Strip 1 demands a general densification. Beside this, on the western part, the separation of the granite from crystalline rocks is a future task for geophysics. An as exact as possible knowledge of the basin-floor is of hydrogeological importance too. The Mesozoic formations of the strip-element **1b** also await subdivision. On the eastern part of the strip, the hope for Lias coal measures (for the formation) requires structural investigation.

Strip 2 also requires a general densification. Special tasks: the tracing of the faulted zones, of buried diabase and phonolite bodies, of the possible ore-lodes of the granite (in the vicinity of Nyugatszenterzsébet), of the Lias coal-measures in the vicinity of Kán, Abaliget, Tekeres, Orfű.

On the strip 3, beside a general densification, the task is an exact determination of basic metamorphites, and the investigation of an accidentally "productive" Upper Carboniferous. Northeast of the Mórágy hills, the contact of the granite and crystalline schists is to be traced; beside this, an attempt is suggested to reveal accidental ore-veins (pirite, chalcopirite, tetrahedrite, molibdenite) of the thick loess-covered granite area.

On the strip 4, the task is to delineate the exact boundaries of the strip, the separation of the Permian-Lower Triassic from the Anisian, the limitation of the areas of bauxite of commercial significance, the determination and delimitation of the (Permian-Lower Triassic) gypsum formation.

In the strip 5, the further task of geophysics is the exact determination of possible oil-structures in the Neogene formation.

The most important task ahead of well-logging seems to be the requirement of the tracing of the element-dispersion of the penetrated rocks, along the bore-hole.

Geophysical investigation always insisted and will do so, still more, in future, upon having so-called "parameter-identifying drillings" at disposal.

A great deal of the tasks enumerated can be solved on the present technical level, a part of them, however, nowadays are beyond our reach. The latters show the perspectives of the required development of the instruments and of the methods.

A substantial development in the line of gravity and magnetic instruments cannot be expected in the near-future. The development of these two methods can be envisaged within the sphere of secondary interpretation and calculation of the disturbing bodies. Even aero-surveys seem to be justified for this purpose.

The perspectives of development of the depth-measuring methods have been pointed at in the respective previous chapters. They can be summed up by the statement: increase of the resolving power and penetration below the basin-floor.

The above-mentioned task of well-logging geophysics is – at the same time – its required development.

Every method must aim at an increase of exactness, economy and at the correct geological interpretation.