ACTA BIOLOGICA

ACADEMIAE SCIENTIARUM HUNGARICAE

SUPPLEMENTUM 3

PROCEEDINGS OF THE THIRD MEETING
OF THE HUNGARIAN BIOLOGICAL SOCIETY
Budapest, May 5–7, 1959

AKADÉMIAI KIADÓ
BUDAPEST

1959

ACTA BIOL. HUNG. SUPPL.

ACTA BIOLOGICA

ACADEMIAE SCIENTIARUM HUNGARICAE

SUPPLEMENTUM 3

PROCEEDINGS OF THE THIRD MEETING
OF THE HUNGARIAN BIOLOGICAL SOCIETY
Budapest, May 5–7, 1959

AKADÉMIAI KIADÓ
BUDAPEST

1959

ACTA BIOL. HUNG. SUPPL.

INDEX

Plenary sessions

Section A

Section B

Demonstrations

INDEX AUTORUM

Abstracts of papers read at the plenary sessions

METHODOLOGICAL PROBLEMS IN GENETICAL RESEARCH

GY. FÁBIÁN

ANIMAL GENETICS RESEARCH GROUP, HUNGARIAN ACADEMY OF SCIENCES, GÖDÖLLŐ

Mention of methodological questions concerning genetic research reminds biologists of various procedures employed in investigation and of laboratory techniques in the first place.

To workers engaged in sciences dealing with universal regularities, to philosophers, questions of method and methodology mean a way of thinking rather than a technical solution. In philosophy method implies the regular sequence of our notions, conclusions, and inferences formed on the basis of facts, the association, consistent use, and appropriate application of our notions, conclusions, and inferences (FOGARASI). Technical solutions are highly important in revealing facts, because data reflecting the truth can be obtained only by accurately performed experiments, and adequate observation. In genetics, too, data reflecting the truth are the vital element of our train of thought, which will be correct if it reflects genetic facts in their correlations and motion. Truthful representation of this motion and its causes is one of the aims of genetic research, and can be correct only when both the employed technique and genetic methodology are good. Thus the technical aspects and the methodology of genetics do not constitute contradictory or reciprocally subordinate notions, but are mutually supporting factors from whose interaction the theory of genetics is derived.

The gradual formation of methods may be taken into consideration in the order of discussion. Of the methods employed in studying the genetic build of any living creature, first the methods of analytical character, then step by step the procedures comprising several synthetic elements and endeavours towards transformation and change. On this basis the following may be suggested as the outline of a genetic methodology to be elaborated in the future.

I. Methods for the study of genetic systems (genetic structure of various living beings).

1. Observation
2. Biometric method
3. MENDEL's method
4. Cytological method
5. Method of cytomorphosis
6. Phaenogenetic method

II. Methods for transforming genetic systems (genetic disposition):

1. Artificial mutation
2. Transformations
3. Methods of complex influences.

1. In scientific genetics, observation is the first but oldest practical method which is still effective and irreplaceable in the collection of facts. Even to-day, in the era of experiments, we cannot go so far in the appreciation of modern methods as to deny the significance of observations. The value of observation is evidenced by the magnificent advance of biology in the middle of the 19th century and the subsequent work of DARWIN and his circle. The technique of observation has also shown marked development in our times.

2. In genetics, the biometric method is associated directly with the method of observation. The former preceded the experimental method and has lately assumed increased impor-

tance. The biometric method takes into consideration visible and measurable external properties of organisms, the final condition, or the characteristics measurable in certain stages of development, and compares these within groups of related individuals. The parameters formed by the biometric method are of great significance in describing the so-called quantitative characteristics of heredity. The biometric system has the fault that its material is not tested individually. In twin research and applied to features inbred for a long period of time it may nevertheless provide a reliable basis for genetic inferences.

3. In genetics, the experimental method has been named after MENDEL who was the first to succeed in carrying out greatly simplified experiments in cross-breeding and, what is still more important, to back them up by successful methodology. After repetition of MENDEL's experiments, starting, as it were, with the rediscovery of MENDEL's experiments, innumerable studies have been undertaken by the aid of the experimental method. The technique and organization of cross-breeding experiments was developed, the factorial theory of heredity was evolved from obtained facts on the basis of MENDEL's train of thought. In investigations concerned with the heredity of simple qualitative or alternative varying characteristics, the experimental technique and MENDEL's methodology are in reassuring harmony, and in simple cases the above-mentioned factorial work has led to hypotheses. However, when investigation is directed into the sphere of continuously varying quantitative characteristics, we are faced with the case where harmony between the investigating technique and MENDEL's methodology no longer exists. In the field of continuously varying quantitative characteristics, association of the possible method of investigation procedure (biometry) and MENDEL's methodology involves very serious consequences owing to the lack of harmony. This situation has been greatly improved by the introduction of computations at inheritability.

Thus, as shown above, MENDEL's method is attended by the danger that our attention is focussed on the heredity of single qualitative differences ; as soon as we come up against a more complicated characteristic, difficulties increase. Execution of MENDEL's method is rendered still more problematic by emergence of the similarities and deviations displayed by taxonomic categories irrespective of species.

4. The cytogenetic method has given the most extensive contribution to the experimental method ; the reciprocal effects of these two have played the most decisive rôle in the development of present-day genetics. At the same time it is also confirmed that observation never ceases to be pertinent in the field of natural sciences, since cytology, too, is based on observation, although it has also developed many experimental procedures in its own sphere. Methodology of the cytogenetic method rests on the thesis that the reproductive cells being the sole link between parent and offspring in living beings of higher order, assumption of involvement by these cells in responsibility for hereditary properties is a logical necessity. The gene theory has been derived from MENDEL's analysis and cytological observation. Recently biochemical conception has come to dominate also in cytogenetic methods. Due to utilization of biochemical methods in cytogenetic investigation, the view has become prevalent that the cell nucleus, with its permanent DNS content, its characteristic macromolecular structure and the connected cell nuclear protein, plays a significant part in maintaining genetic continuity ; this explains the statistic regularity of some courses of heredity, but it has no imperative power, and appears rather as an informer or still more as a transformer in the metabolic interaction with cytoplasm.

5. The cytomorphosis method rests on comparison between normal course of development and that marked by hereditary deviation, starting from the earliest stage of development. This method shows the closest relations to comparative and experimental evolutionism. The limits can hardly be defined.

6. The concept underlying the phaenogenetic method calls for retrograde study of the course of development, backwards from the fully developed characteristic, in order to trace the point where the line of development in individuals of varying heredity enters on a separate path. This trend of investigation is also termed physiological genetics to denote that comparative physiology, biochemistry, histology, etc., and the methods of several related branches of science are used with complete freedom and always with the special view to learn about the development and existence of inherited differences quasi in the course of progress.

This method arouses a significant reaction by the related fields, because comprehension of the species specific normal course of development is promoted by the study of defective types, showing dissimilar genetic constitution and not infrequently affected by inherited disease. In a mutant course of development, characteristic, regularly recurring deficiency symptoms appear in each individual of the species, symptoms due to some effect that cannot be imitated by extirpation of some organ or by any other kinds of inhibitive interference.

1. For a long time geneticists have striven to check the process of mutation experimentally by inducing arbitrarily new hereditary properties in an experimental population.

This wish has been partly realized, since so-called spontaneous processes of mutation have been greatly accelerated by various means of external interference. The first efficiently elaborated method was introduced by MÜLLER who exposed *Drosophila* to X-rays. The CIB technique he employed has become important in genetic investigation. Other methods for producing artificial mutation include the use of ultraviolet light, extreme temperatures, active chemical substances, irradiation of culture media, hybridization.

The production of artificial mutations has a fairly developed technique, but the whole concept still lacks establishment of the principle laying down how the process ought to be actually directed.

2. Microbial transformation has provided an approach to the objective of bringing about arbitrarily artificially induced changes in hereditary disposition. In the sphere of microbial transformation, technical solutions and the results obtained by cytochemical analysis (the rôle of nucleic acids) have led to useful methods. — Application of the same methodology to animals of a higher order (BENOIT, KUSHNER, HEWER, TIGYI—BENEDECZKY—LISSÁK) would seem to point to the necessity of carrying on work as regards technical execution, in addition to the satisfactory concept.

3. Complex genetic methods imply not only the joint simultaneous execution of several analytical investigations, but also effects exerted on living beings as a result of which any change of hereditary disposition appears in alignment with environmental conditions. In this field we have reached the specific methodology of plant improvement and live-stock breeding. — This methodology rests on three main factors : (1) loosening of a living being's heredity (by hybridization, articifial polyploidization, transplantations, artificial mutation, biochemical transformation, etc.) then, (2) in a purposefully selected environment, (3) synchronous selection in the desired direction. Joint use of the three factors may produce a qualitative leap. — This methodology is accompanied by the difficulty that analytical evaluation is not always satisfactory (PLATONOV).

The common features of the enumerated methods can be stated in several points.

As in the sphere of various modern sciences (FOGARASI) when they cooperate with other branches of science, genetic methods are characterized by overlapping.

Among biological sciences, genetics has been able to introduce quantitative thinking most effectively.

In genetic methods, there is a serious need for the dialectic, epistemologic elaboration of the following notions : character—property—stamp.

When genetic methods of analytical character are outlined, one finds oneself in the field of methods varying as to complication. Heredity of clearly defined, easily differentiated qualitative deviations within a species can be accurately described, and on the basis of the experimental method can be explained by the theory that hereditary disposition is decided by the special structure and metabolism of the cell nucleus. In the sphere of continuously varying quantitative characteristics the same is manifested in such a complicated degree that the above hypothesis is no longer satisfactory. A new methodology is needed providing a better approach to, and explanation of, this more intricate and complex form of motion. As comparison one might say that the difference between the level of the first system and that of the second may be likened to the difference between molecular and macromolecular chemistry. When studying the heredity of the differences and similarities shown by species hybrids or higher taxonomic categories, we are confronted by even more complicated questions at a still higher level. In this sphere both our technique of investigation and our methodology are deficient. Perhaps the biochemistry of specific proteins and further advance in comparative embryology will open the road for genetics which at the present moment is hardly able to step beyond the sphere of physiology concerned with the variations occurring in a species.

In genetics, the facts that have so far been collected in various fields should not be rejected "with reference to the necessity of freedom from contradiction in the theory" because of the contradictions shown by experiments performed according to systems of varying level and by investigations carried out after various methods and dealing with philogenetically widely diverging living beings or any of their properties. "To admit objectively existing, different, even contradictory properties of objects does not imply logical contradiction. Since this is the situation, these properties should be investigated, observed, known from various aspects, in various relations. From the logical—epistemologic point of view this provides a basis for regarding comparison of various experimental results as justified and necessary in order to elucidate an object from different angles." (FOGARASI)

Also in genetics, the answers to our problems will have to be found by further concrete experimental and theoretical studies.

METHODS AND RECENT RESULTS OF RADIOBIOLOGY

V. VÁRTERÉSZ

INSTITUTE OF RADIOBIOLOGY, BUDAPEST

The methods of radiobiology are very different according to the various fields of biology. What investigations into the effects of radiation have in common is only the application of rays. Radiation may emanate from external sources (X-rays, radium, accelerators, reactors) or may be applied internally (radioactive isotopes). Irradiation may be local when only certain organs are irradiated, or total when the entire organism is exposed to the rays. The manner of application is governing the nature of the biological response. The biological effects of irradiation are based on the ionizing power of rays. Only that part of radiation energy is efficient which is absorbed by the body. That is we are calling the dose. Various concepts of doses are known, such as r, rad, rep or rem. Of widest use is the rad which means 100 erg of energy absorbed by 1 g of body tissue. To explain elementary ray effects, two theories have been advenced: (1) the so-called *hit theory*, derived from DESSAUER's theory; (2) the *theory of water activation* set up by WEISS. According to the first, ionizations exert a direct effect upon biomolecules; according to the second, ionizations produce chemically active radicals from the water which react with the biomolecules so that, in this case, the effect of irradiation is *indirect.* The rule of BERGONIÉ-TRIBONDEAU says that the sensitivity of cells and tissues to rays depends on (1) the degree of differentiation, (2) the capacity of proliferation, (3) the functional condition. Less differentiated, rapidly-dividing tissues with a high metabolic rate are more sensitive to rays. Radiosensitivity of the various species is characterized by the *median lethal* dose (LD_{50}). This means the dose which — when applied as total irradiation to a larger group of test animals — kills 50 per cent of the individuals within 30 days. Poikilothermal animals kept at low temperatures and winter-sleeping animals during hibernation display a lower radiosensitivity. This phenomenon is due to the reduced metabolism of such animals. Sensitivity is reduced by a prolonged administration of the dose as also by its fractionation. Biological reactions to irradiation have a longer or shorter period of latency. Radiation provokes disturbances in the metabolism of carbohydrates, lipids and proteins; the activity of certain enzymes is diminished; nucleic acids are depolymerized and their synthesis is prevented. Basal metabolism remains unchanged, however. Mitosis of cells is inhibited even by small doses of irradiation. The cytoplasm is more resistant. Total irradiation causes the gravest damage in the mucosa of the small intestine, in the lymphoid tissue and the haemopoietic marrow; it is disturbing the mechanism of clotting and increases vascular permeability. The hypophysis-adrenal system undergoes a change similar to stress. Soviet authors have found also the nervous system to be functionally rather sensitive to rays. Irradiation lowers the organism's resistance to various infections, a phenomenon possibly partly due to the diminution of properdin. Gonads are exceedingly radiosensitive. The injury of the damaged cells is transmitted to the offspring. The inheritance of genetic lesions is usually recessive. From the viewpoint of genetic effects, all doses received in the course of life are summed. Their sum is the *generation dose.* During the last 10 years a number of compounds have been found to possess radioprotective effect. Most of them contain the SH-radical or belong to the amino-compounds. They are effective only if administered prior to irradiation. Transplantation of bone-marrow ensures good therapeutic effect, a method that has been successfully applied in human pathology during recent years.

Recent results obtained in the various fields of radiation research are described in the report.

INVESTIGATIONS INTO THE VEGETATION OF THE SOUTHERN BORDER OF THE NORTH-GERMAN PINE FOREST REGION

H. ULBRICHT and M. BRIX

BOTANICAL DEPARTMENT OF THE POLYTECHNICAL INSTITUTE, DRESDEN

Most of the examined forest types constitute artificial associations consisting of mixed pine woods and common oak-birch trees. Fragments of natural associations are encountered in certain oak-hornbeam and alder woods as also in alder morasses; their stock is of comparatively small size and the influence of man's work is observable. The dry sandy soil of mixed

pine forests, poor in foodstuffs, is — on the whole — sensitive to anthropogenetic influence and has a poor regenerative power. Soils of this kind are strongly affected by the damaging influence of human intervention and this has led to a change in the sociological structure of the forest types. Whether plant associations are natural or created by human agency is of practical importance. Because of the small number of varieties in these pine forests, no definite answer could in this respect be obtained from the purely sociological investigations, and only soil research yielded useful information. It was by means of the evaluation of a pollen diagram that a definite answer could be obtained to the question of whether one was dealing with natural or silviculturally planned associations. The geographical position of the examined region is marked by areal type spectra. Varieties of the boreo-meridional-ocenic areal type are predominant.

A combination of the results of plant-sociological, geographical, documentary and pollen-analytic investigations provides a comprehensive picture of the examined area and reveals the existence of complex relationships.

Abstracts of papers read at the sessions of the Section A

THE POSITION OF HISTORICAL ANTHROPOLOGY IN ANTHROPOLOGY

P. Lipták

DEPARTMENT OF ANTHROPOLOGY, NATURAL HISTORY MUSEUM, BUDAPEST

Anthropology, the science dealing with man as a being of nature, has become a discipline far more intricate than any branch of biology, because it must draw into the sphere of its research also the phenomena pertaining to the mental activity of man. We may therefore speak of a sensu stricto anthropology (physical anthropology), and one taken in a wider sense, although the disciplines belonging to the latter have become independent already at an earlier date. Also historical anthropology (paleoanthropology) admits both of a stricter and a wider acceptation.

The main task of *historical anthropology* is to reconstruct — on the basis of existing skeletal materials — the anthropological make-up of the communities under discussion. The possible methods of paleoanthropological synthesis are the following :

(1) If we emphasize the *taxonomical* point of view, we are founding our synthesis on the principle of *spatiality*.

(2) If besides regional distribution the taxonomic point of view enforces also the principle of *temporality*, we get an answer to the evolution of the human forms. This is fundamental also as an autotelic research, for the synthetic conception of the unity of living forms rests on the principle of evolution.

(3) The examination of *ethnogenesis* is a complex problem, which must rely upon all the disciplines of anthropology taken in a wider sense. In anthropological research purposing such aims we must perform the intraserial analysis, endeavour to point out the relations to the chronological or ethnical groups, and examine on the anthropological material itself the spatial and chronological relationships.

SOME PROBLEMS OF THE BIOLOGICAL RECONSTRUCTION IN HISTORICAL ANTHROPOLOGY

J. Nemeskéri and L. Harsányi

ANTHROPOLOGICAL DEPARTMENT OF THE NATURAL HISTORY MUSEUM, BUDAPEST

and

DEPARTMENT OF FORENSIC MEDICINE, MEDICAL UNIVERSITY, BUDAPEST

It is only by means of systematically performed biological and sociological reconstructions that we can gain a reliable knowledge of man and human communities as they existed in space and time.

A solution of the typological problems, including those concerning the genesis and systematics of races, constitutes the nucleus of biological reconstructions required for the purposes of physico-anthropological research work.

The greater the number of data regarding processes that have occurred in both individuals and communities on which biological reconstructions are based, the more reliable will be the results concerning a given population or a series of populations in a given area. Typological reconstructions should, therefore, always be preceded by a gradually performed, systematic biological reconstruction which has to extend to various factors. Determination of sex, age, constitution, palaeophysiological and palaeopathological condition are the successive stages of biological reconstruction.

After describing the complex theoretical and practical methods for the solution of the said problems, the authors offer the more important data concerning the population of the graveyard of Kérpuszta (11th century): these data are presented as a good example of a biological reconstruction and are, at the same time, a good check of the accuracy of earlier determinations. It was in the case of 270 individuals buried in the said cemetery that figures concerning their age that had been determined with the earlier classic method proved to be in need of correction. Modifications necessitated by the new complex method varied between 1 and 45 years. Particular significance attaches to this fact in respect of typological investigations.

Of a total of 405 skeletons found in the cemetery of Kérpuszta those of 59 individuals revealed pathological alterations, *i. e.* approximately 15 per cent of the total. Not more than five skeletons, *i. e.* nearly 9 per cent of the 59 pathological cases and slightly more than 1 per cent of the total, showed signs of grave diseases. The 59 pathological cases covered a range of 6 diseases (spondylosis in 45, spondylarthrosis in 7, arthrosis of the limbs in 7, rachitis in 3, status post fracturam in 7, and *von Recklinghausen*'s disease in 1 case). These figures become even more striking if we compare them with those obtained from the population buried in the graveyard of Gáva dating likewise from the 11th century. A total of 35 skeletons was found here, 12 of which revealed signs of grave alterations due to 9 diseases (spondylosis in 5, spondylarthrosis in 3, arthrosis in 3, ankylosis in 1, synostosis praecox — increased intra cranial pressure in 1, spondylitis tuberculosa in 1, coxa vara adolescentium in 1, status post fracturam in 3, osteomyelitis, ostitis ossificans and uncertain diagnosis in 2 cases).

AGE AND SEX VARIATIONS OF THE CRANIAL SUTURES IN MAN

IRÉN PINTÉR

INSTITUTE OF ANTHROPOLOGY, EÖTVÖS LORÁND UNIVERSITY, BUDAPEST

In determining age, ossification of sutures is of great importance, especially when only the skull is available and thus other factors determining age cannot be made use of.

Author has therefore studied 116 skulls, 56 crowns (top of the skull) and 1533 X-rays of skulls from subjects whose age and sex had been known. In the ectocranium obliteration began in the sagittal suture (at 25 to 30 years of age), followed by the coronary suture (30 to 35 years). The lambdoid suture becomes obliterated last (at 32 to 36 years of age), though it is often patent even in senile age. The other sutures show a very poor tendency to obliteration and are therefore of no use in determining age. On the internal surface of the skull the synostosis of sutures is more marked, regular and shows less individual variation and is therefore more suitable for assessing age. The X-ray studies yield values intermediate between those for the ectocranium and endocranium, and are less variable. This may be explained by the fact that we can examine only the two surfaces by the naked eye, whereas X-rayes, penetrating deeper, show the diploe-ectocranial part of the skull. The differences between the sexes and those between the two sides are so slight that they can be ignored.

Thus, when examining both the outer and inner surface of the skull it will be the endocranium in the first place that is helpful in determining age within a range of 10 years. However, whenever possible also other factors facilitating determination of age should be analyzed.

ANTHROPOLOGICAL ANALYSIS OF A "BARKÓ" VILLAGE

M. MALÁN and T. RAJKAI

DEPARTMENT OF ANTHROPOLOGY, NATURAL HISTORY MUSEUM, BUDAPEST

and

INSTITUTE OF ANTHROPOLOGY, UNIVERSITY, DEBRECEN

In 1952, authors made anthropological measurements on about one third of the population of Csernely, a village in the County of Borsod in the Northeast of Hungary. The inhabitants of the village belong to the ethnic group of the "Barkó", a branch of the Palots people. A total of 521 adult persons — 229 males and 292 females — were analyzed. They were divided into three age classes: (1) the young group, consisting of 35 males and 55 females, comprised persons aged from 18 to 24 years; (2) the middle-aged group, consisting of 183 males and 226 females, included persons aged from 25 to 64 years: (3) the old group, consisting of 11 males and 11 females, was composed of persons over 65 years of age.

Average body height. The young and the middle-aged groups had a medium height (♂♂ 166,6—166,0 cm, ♀♀ 156,3—154 cm); while the average height of the old group was small medium (♂♂ 163,3 cm, ♀♀ 151,8 cm). *Average body weight* (in the sequence young-middle aged-old). ♂♂ 59,7—69,9—60,7 kg; ♀♀ 54,4—57,7—53,7 kg. *Average height in a sitting posture.* ♂♂ 87,5 cm in the middle-aged; 87,3 cm in the young; 85,0 cm in the old group. ♀♀ 82,38 cm in the young; 81,9 cm in the middle-aged; 78,5 cm in the old group. *Average length of limbs.* Values were very variable as regards upper limbs. Lower limbs of ♂♂ 90,69 cm in the young; 90,6 cm in the old; 89,52 in the middle-aged group. ♀♀ had shorter lower limbs. *Width of shoulder.* The highest average value was measured in the middle-aged group among the ♂♂ (38,14 cm) and in the young group among the ♀♀ (34,71 cm). *Width of pelvis.* The highest mean value was found in the group of old ♀♀ (31,09 cm). *Thoracic circumference.* Highest value was found in the group of middle-aged ♂♂ (93,16 cm). *Cephalic index.* All groups brachycephalic. *Facial index.* All groups belong to the medium broad type. *Colour of eye.* 21,05 per cent of the ♂♂ and 24,31 per cent of the ♀♀ had brown eyes. *Colour of hair.* 82,25 per cent of the ♂♂ and 88,66 per cent of the ♀♀ had brown hair.

PHYSICAL DEVELOPMENT AND PERFORMANCE OF GRAMMAR-SCHOOL STUDENTS

O. EIBEN

INSTITUTE OF ANTHROPOLOGY, UNIVERSITY, DEBRECEN

Physical development of the child has come to the forefront of scientific interest during the last years. Changed economic, social and hygienic conditions exert a powerful influence on the growth and bodily development of adolescents. Investigations into the pertinent problems have become more numerous all over the world and so also in Hungary.

Comparing present data with those collected before World War II certain deviations become conspicuous. Such differences, as also the fact that scarcely any data from West Hungary had been available, induced the author to perform anthropometric observations on some 250 students of the grammar school at Körmend: measurements of this kind have been made since 1957 every year. The evidence of these "serial investigations" justifies the conclusion that — in comparison with other recent material from other parts of Hungary — the students of Körmend display a good average physical condition as regards body height, body weight, thoracic circumference at normal respiration, and muscular strength. Mean values were somewhat higher in 1958 than in 1957. It lies in the nature of these "serial investigations" that the growth and development of each age-class can easily be followed.

Observations were also extended to correlations between physical development and achievements in the field of sports. Results achieved by the Körmend grammar-school students in flat races over 60 and 100 m, in broad and high jump and in shot-putting are, generally speaking, on a level with results registered in other places of West Hungary.

It is pointed out by the author that a careful analysis and a correct evaluation of the child's achievements in the field of sports constitute a "conditio sine qua non" of all scientifically and biologically conducted physical trainings. Its promotion forms one of the tasks of anthropology.

ALTERATIONS OF THE PANCREAS IN OLD AGE

EDIT BEREGI and L. HARANGHY

2nd DEPARTMENT OF PATHOLOGICAL ANATOMY, MEDICAL UNIVERSITY, BUDAPEST

Pancreas' from 70 subjects above 60 years of age and, as controls, from 10 young subjects were studied. The causes of death of the 70 old subjects were : cancer in 22 cases, emollition of the brain and cerebral haemorrhage in 14, heart disease in 14, tuberculosis in 9, renal disease in 5, hypertrophy of the prostate and sequelae in 5, cirrhosis of the liver in 1 case. Histologic study was restricted to changes in the exocrine part and it was found that in 39 of the 70 aged subjects the epithelial cells of the acini often turned acidophilic, zymogenic granules were absent and here and there the cytoplasm and nucleus were markedly shrunk. In other instances vacuolisation, flattening and the appearance of homogeneously staining material in the centre of epithelial cells were seen. In 25 cases this material stained metachromatically with HEIDENHAIN's azan and with GOLDNER's trichrome stain. In 19 cases this metachromatic material was demonstrable also in the efferent ducts and in 8 cases microliths were visible. In 8 cases these changes were associated with interstitial oedema. In addition to these dyschylic changes, at certain places fat and an increase of interstitial connective tissue were also demonstrated. It is believed to be likely that the dyschylic changes in the pancreas are produced by diseases suffered during life or the disease leading directly to death. The changes mentioned being common in old age, authors suggest that pancreatic affection should be also taken into consideration as one of the causes of digestive disturbances in old age, alongside the old age changes of the stomach and intestines.

THE LESIONS OF THE KINETIC ORGANS IN THE VALE OF YEARS

I. SZIRÁKY

SANATORY OF THE TRADE UNIONS COUNCIL, HÉVÍZ.

With the increasing of human lifetime, the biologist as well as the pathologist and the healing physician need to acquire new knowledge concerning senium.

In judging the changements of age of the motile organs we are put at a tight corner since we mostly find them as secondary signs without causing any complaints. As a matter of fact, it is difficult to segregate in old age whether we have to deal with biological case or a pathological one.

These are to be found in every relation, either we consider the bony skeleton or the joints, the ligaments and muscles or the vascular and nerve system supplying all of those.

The basis of senile osteous degenerations is the decline of the calcium and phosphorus level or rather the change in their reciprocal rate. The chondroid tissue looses its elasticity and first of all, its water content. The osteophyte formation serves to defend the flattened cartilege discs which, when fully developed, may establish a bridgelike contact as we see it at the vertebrae. Having lost their elasticity, the ligaments easily lengthen or, on the contrary, they shorten.

The weakening and the secession of the musculature can be traced back to qualitative differences, the cause of which may be primarily attributed to the lack of dilating in the capillar system. The most remarkable lesions are noted along the spinal column, at the knees and the hips. The majority of complaints also refer to these tracts. Concerning old age lesions it is peculiar that after proper threapeutic interventions, the complaints cease to exist without the disappearing or regression of the alterations shown by X-ray.

Thus it is probable that not so much the alterations of bones and joints are responsible for the pains and stiffnesses, but the accompanying occurrences of the moving apparatus.

MANAGEMENT OF THE AGEING FEMALE WORKER

V. MISKOLCZY

PÉCS

The health of pregnant women, mothers in the puerperium, and female workers over 55 is protected by decrees in this country. No decrees regulate the care of female labourers in the menopause. Menopause is not yet old age, it is merely another step toward old age, and may give rise to severe complaints warranting interference. Of 1500 women in menopause 6,2 per cent were symptom-free. Most of the complaints were of nervous origin. Neurohormonal changes, changes in circulatory functions, as intrinsic factors, work and working conditions as extrinsic factors may influence the imbalance resulting from static, thermic and chemical effects in the negative direction, if we fail to take proper measures in time. Disorders of the cycle may also warrant interference. Palpitation, hot flushes, migrain, angina may make the climate of the usual working place unbearable. The woman in menopause exposed to physical strain, who has to walk on steps, carrying weight shows an increased tendency to hypotension, and the sudden rise and lasting fall of blood pressure may lead to accidents. Irritability, rapid changes in mood may be the source of serious frictions. Formerly well-tolerated noises, especially the high-pitched ones, are almost untolerable. Smells, to which she had been accustomed, become intolerable. Physical strength declines, sight is failing, the sensitivity to light intensity (neon) increases. Also other complaints may seriously interfere with work. Those who had suffered much inconvenience during menstruation will have a transient period of greatly improved sense of well-being, ability of working, at the onset of the menopause. The ageing female worker requires more attention from the factory physician.

OXYGEN CONSUMPTION OF AQUATIC ANIMALS AT VARIOUS TEMPERATURES

E. WOYNÁROVICH

BIOLOGICAL RESEARCH INSTITUTE OF THE HUNGARIAN ACADEMY OF SCIENCES, TIHANY

Temperature is the most important environmental factor of the process of biological production. In order to study this problem and to be able to measure the oxygen consumption of various aquatic organisms of the lower orders at different degrees of temperature between 0° C and 30° C, an apparatus has been constructed and a method elaborated by the present author. The apparatus had to be designed in such a manner as to separate the animals from the water-filled space after exposure. It is consisting of two parts: (1) a tube (capacity, 22 to 25 ml) provided with a closely fitting glass stopper at each and; (2) a vessel of polyvinylchloride (PVC) annexable to the broader end of the tube. The PVC-vessel is provided with incisions and the glass tube with nipples so as to ensure the possibility of accurate re-adjustment. The vessels are calibrated. Prior to the experiment, the animals were kept at the desired temperature and washed 8 to 10 times with water of known O_2-contents and temperature. The vessels were placed in water-filled thermostats during the experiment. After the time of exposure had expired, the animals were herded into the PVC-vessel and separated from the water. The O_2-content of the tube's residual water was determined with WINKLER—MAUCHA's technique (n/200 $Na_2S_2O_3$). The oxygen consumption of *Palingenia longicauda*, *Ephemera danica* (Ephemeroptera) and *Gammarus roeseli* (Crustacea, Amphipoda) was observed at seven different points between 0° C and 30° C. It was found that the oxygen consumption of these animals did not change in a uniform manner with increasing temperature: the consumption curve showed first a steep upward course, then a flat portion which was followed by another steeply upward section and, in some cases, a downward course at a temperature of 28 to 30° C.

INVESTIGATIONS OF LABORATORY CULTURES OF GAMMARIDAE

F. LUKACSOVICS

BIOLOGICAL RESEARCH INSTITUTE OF THE HUNGARIAN ACADEMY OF SCIENCES, TIHANY

The species *Gammarus roeseli* GERV. down to the F_3, and the species *Dicerogammarus villosus bispinosus* MART. to the F_4 generation were cultivated in an apparatus of the author's own invention, which had a continuous supply of streaming lake (Balaton) and tap water, while the conditions of oxygen supply, temperature and light were variable at discretion. The lacustrine *D. villosus* did not survive either in running tapwater or in stagnant water (*e. g.* in a flat enamel dish) taken from its natural environment. The riverine *G. roeseli* survived in both types of water, but only if the water was constantly kept running. The crustaceans observed are poikilothermic organisms, and — given optimal hydrochemical conditions — most of their biological functions depend mainly on temperature. Rise of temperature reduced the period of precopulation, shortened the growth of the embryos, the development of the young animals right up to their sexual maturation, and diminished also the interval between ecdyses. The *D. villosus* attained a body length of 7, the *G. roeseli* of 8 mm at sexual maturity. Cultivation — depriving the animals of their natural environment — changed certain of their properties. Pigmentation, for instance, was weaker in the laboratory animals, nor were the vernal generations of the *D. villosus* red-eyed ; the period of rest, which lasts in the case of *D. villosus* from October to March in the Lake Balaton, failed to appear in the culture ; thus propagation continued without interruption through the whole year, which proved this important biological function to be plastic character of *D. villosus*, governed by the change of seasons and temperature. Results obtained in the laboratory were compared with a great many observations made in the field ; correlations between body length (age) and number of ova, as also between mortality and the quantitative and qualitative conditions of nutrition were examined.

THE ROLE OF MUSSELS IN WATER PURIFICATION

L. HARANGHY

2nd DEPARTMENT OF PATHOLOGICAL ANATOMY, MEDICAL UNIVERSITY, BUDAPEST

Experiments made with various fresh-water mussels *(Unio, Anodonta, Dreissenia)* and marine mussels *(Tapes, Mactra, Pecten, Venus, Mytilus minimus, Ostrea plicata, Ostrea edulis, Solen, Solecurtus, Lithodomus)* justify the conclusion that mussels possess a strong water-purifying capacity by precipitating substances suspended, and bacteria contained, in the water. It has been proved that this process is going on even under unfavourable conditions of oxidation, *i. e.* in contaminated water. It was possible to demonstrate that, beyond precipitating bacteria, mussels digest those which gain access to their alimentary canal, especially if no other organic substances are available. Experiments with *Bacillus paratyphus B. Schottmülleri* and further experiments with *B. p. Breslaui* made it evident that endotoxin is liberated by the bacteria in the mussels ; we succeeded in demonstrating the endotoxin by complement fixation. These results allow us to conclude that mussels constitute a significant factor in the self-purification of waters so that a protection of mussels is imperative for the purity of waters.

HYDROCHEMICAL ANALYSES OF PRIMARY VEGETATION IN RIVULETS

B. ENTZ

BIOLOGICAL RESEARCH INSTITUTE OF THE HUNGARIAN ACADEMY OF SCIENCES, TIHANY

The chemical properties of Lake Balaton and the waters in its neighborhood have been studied during the last years. The present study is concerned particularly with the sources and streamlets of small water discharge in the upper region of the lake. These waters are of the β-mesosaprob, β-limno-type, most of which belong to MAUCHA's $HCO_3^- — Ca^{++} — Mg^{++}$ eutrophic group (karstic sources), while a minor part to the $HCO_3^- — Ca^{++} — Mg^+$ oligotrophic group (basaltic sources). Following the rivulets from their source to their mouth, three

different sections may be distinguished. In the course of their flow, abiotic (decrease in CO_2 and Fe^{++}; increase in O_2 and Mg^{++} [and biotic changes] disappearance of CO_2; appearance of CO_3; decrease in Ca^{++} and HCO_3^-; increase in pH-value; etc.) occur with the result that — as regards chemical composition — all waters emptying into the lake become more and more similar to the water of Lake Balaton. Environmental factors (*e. g.* a streamlet of sluggish flow, coming from a sunlit meadow, reaches a dense forest or a declivitous terrain where its current becomes more rapid) may cause a slowing down, reversal or repetition of the said processes. Each section of the streamlets has its characteristic coenosis. Samples of water, taken from identical places at various times of the day and in different seasons, enable us — with due regard to water discharge and oxygen content — to draw conclusions as to the amount of organic matter produced in a unit of time (*e. g.* in a day, a year, etc.). Chemical changes occurring in rivulets with a small water discharge and rich in submerged aquatic vegetation are prompt, considerable and well perceptible, which is not the case with richly flowing waters comparatively poor in vegetal growth. Thus, the first-named category of streamlets is eminently suitable for the study of interactions between vegetation and hydrochemistry.

STUDIES ON DETRITUS DRIFTS OF THE SHORES OF THE TIHANY PENINSULA

J. Gellért and Gizella Tamás

BIOLOGICAL RESEARCH INSTITUTE OF THE HUNGARIAN ACADEMY OF SCIENCES, TIHANY

The sediment of shallow water thrown up by waves accumulates in the form of detritus drifts on the shores of Lake Balaton. Arising on the boundary line between water and land, these characteristic littoral formations are exposed to environmental influences from both sides. Therefore in detritus drifts a very diversified world of living organisms — mostly microscopic — develops, in which ciliate infusorians and diatoms are encountered at a particularly high rate of species and individuals.

Between the Ciliata and the other micro-organisms of the detritus drifts formed on the shores of the Tihany peninsula a very intensive nutritional interaction arises which is subject to quantitative and qualitative variations in accordance with the effect of varying environmental factors. Nutrition of the Ciliata on the eastern and southern shores of the peninsula is based in the main on bacteria, this diet being supplemented by diatoms on the eastern and by green algae on the southern shore. As a consequence these micro-organisms, leading an active life and propagating in the detritus drifts, give rise to the accumulation of metabloic products in the biotope. Washed off by the surf, these products gain access in the cycle of matter of the lake, while fresh waves drive ashore ever new and new inorganic and organic matter which is added to the matters of the detritus drifts and contributes to the survival of its micro-organisms. A process of continuous interchange between drifts and water is thus ensured. It follows that chemical and biological processes occcurring in the detritus drifts are influence on the living world of the littoral zone and on the cycle of matter in the lake.

THE PHYTOSOCIOLOGICAL ROLE OF FONTINALIS ANTIPYRETICA L. IN THE PHRAGMITETA OF LAKE BALATON

L. Tóth

BIOLOGICAL RESEARCH INSTITUTE OF THE HUNGARIAN ACADEMY OF SCIENCES, TIHANY

Several types of *Scirpeto-Phragmitetum* growing along the shores of Lake Balaton might be distinguished on the basis of height, density of shoots and the variety of the accompanying plants. (Approx. 300 phytocenological surveys.)

Regarding some ecological factors, there are differences between the external and internal parts of reeds. The water of Lake Balaton, turbid due to solid particles and calcium carbonate precipitates suspended in it, enters the reeds from the direction of the open lake and penetrates into it to different distances. This open-lake water is usually oversaturated by O_2 and contains only a little amount of CO_3; CO_2 can be found at most in traces.

In the depths of reeds, where the effects of wave movement cease, the water clears by the sedimentation of suspended particles. Due to the decomposition of organic sediments the O_2 content of water gradually decreases and free CO_2 appears.

Studying the life of reeds, either from practical or from theoretical point of view, it would not be indifferent to state the dividing line between these two qualitatively different zones. This line can be stated without more or less complicated ecological measurements, for it is indicated by the presence of a mass vegetation of *Fontinalis antipyretica*. This aquatic moss lives in a narrow zone in the inner part of the reeds, where the above-mentioned two types of water meet. It is in this zone where the water containing O_2 of the open lake and the water of the inner parts of the reeds, rich in CO_2, mix. The simultaneous presence of O_2 and CO_2 is an essential factor for the existence of *Fontinalis*.

Owing to its ecological significance, this zone of *Fontinalis* mass vegetation has to be distinguished under the name *Scirpeto-Phragmitetum fontinalosum*.

COMPARATIVE PLANKTONIC INVESTIGATIONS IN THE RIVER TISZA

J. Megyeri

DEPARTMENT OF ZOOLOGY, HIGH SCHOOL OF PEDAGOGICS, SZEGED

The Hungarican course of the Tisza (between Tiszabecs and Szeged) and the estuaries of its tributaries have been investigated. With the object to study those mesozooplankton organisms (Rotifera, Entomostraca) which inhabit the Tisza und its tributaries, and to elucidate those correlations which exist between environmental factors on the one side and the periodical and horizontal development of the mesozooplankton on the other side. A concise summary of the results of methodical collection and systematic observation conducted for a number of years (1952—1958) is given in the following lines.

A potamoplankton of endogenous origin, consisting of comparatively many species (Rotifera, 45 ; Cladocera, 21 ; Copepoda, 18) is encountered in the Hungarian course of the Tisza. Of the species involved the following seem to be characteristic of the river's limnological conditions : *Brachionus angularis, Brachionus calyciflorus spinosus, Brachionus urceolarus, Keratella cochlearis* var. *macracantha, Keratella quadrata, Notholca acuminata, Polyarthra dolichoptera, Diaphanosoma brachyurum, Bosmina longirostris-typica, Bosmina longirostris-pellucidu, Chydorus sphaericus, Eudiaptomus gracilis, Cyclops strenuus, Thermocyclops oithonoides* var. *hyalina*.

Rapidity of the current is the most significant of the many factors influencing the quantitative and qualitative development of the mesozooplankton. The effect produced by the tributaries — except one, the Sajó, which is considerably contaminated by the waste water of factories — is negligible.

CHARACTERISTICS OF THE POTAMOPHYTOPLANKTON IN THE UPPER REACH OF THE RIVER TISZA AT TIMES OF EXTREMELY HIGH AND EXTREMELY LOW WATER

G. Uherkovich

HUNGARIAN TISZA RESEARCH STATION, SZEGED

The Tisza is one of the most important rivers of Central Europe. Its total length amounts to 964 km out of which 600 km are in the territory of Hungary. Entering the country at Tiszabecs, the river has a pebbly bed, a rapid flow and pure water, *i. e.* displays the character of headwaters, over a stretch of about 20 km. After passing a steep "threshold" or "step" (0,4—0,8‰), its bed becomes sandy, the river arrives at its middle course. "Hungarian Upper Tisza" is called that portion of the river between Tiszabecs and Vásárosnamény at the mouth of the tributaries Szamos and Kraszna which shows the characteristics of the so-called headwaters and also those of middle courses, but has a rapid rate of flow along its entire length.

If we want to study the algal vegetation of the Upper Tisza, the method of making continuous collections at short intervals throughout the year, does not seem to be feasible.

Earlier experiments have proved that the best results are obtained by performing collections at larger intervals, to wit, at times of characteristic water-levels.

The elevation of the water in the Upper Tisza was lastingly high in the middle part of May, 1958. Its potamoplankton was dominated by an association of *Synedra ulna-Ceratoneis arcus* which contained many drifting filamentous organisms.

A very low water-level prevailed for some time in mid-October, 1958. The potamoplankton was characterized at this time by an association composed of *Fragilaria capucina* and *Gonatozygon Kinahani* which was mixed with numerous bottom-dwelling algae in the pebbly part of the bed, and with more representatives of the *Melosira varians* and *Nitzschia acicularis* in the sandy portion.

The water-level was variable but, on the whole, rather low in April, 1959, and the potamoplankton of the Upper Tisza was dominated by an algal association of *Ceratoneis arcus* and *Hydrurus foetidus*. Our investigations were then extended to a portion of the river, 50 km in length, where the rate of flow is sluggish on account of the sluice at Tiszalök. Here, the algal association displayed a lacustrine character.

The principal conclusions drawn from the said three groups of examinations are these : (1) the composition of the potamoplankton in the Upper Tisza undergoes well-distinguishable variations within comparatively short distances ; (2) characteristic conditions of the water-level give rise to the development of widely different algal associations ; (3) the characteristic features of each portion of the river are well reflected by the nature of the algal associations.

THE EFFECT OF INLAND WATER REGULATION ON THE ECOLOGY OF SWAMP-MEADOWS IN THE REGION SOUTH-KISKUNSÁG (GREAT HUNGARIAN PLAIN)

Gy. Bodrogközy

BOTANICAL INSTITUTE OF THE UNIVERSITY, SZEGED

The valley and lowlands of South Kiskunság were before the beginning of drainage chains of swamps and ponds without outflow. We can draw conclusions as to their association relations from the vegetation of their present stagnant waters.

As a result of a rational regulation of inland-waters there developed on the marshy adobe of non-sodic character previously occupied by reed-grass, rushes and swamps — several types of creeping bent grass *(Agrostetum albae)*.

(I) *Principal type on watery soil. (Agrostetum albae hung.)* It develops on the deepest part of the valleys and plains inundated for a long time. On wet soils with high organic content, mostly on drying swamp meadow : (I/1) Meadow type *Molinia*. Besides Agrostidion some Molinion elements. — By drying of reeds with moderate humus-content, light sodaic upper-soil : (I/2) Meadow-type *Phragmites*. In favourable soil-ecological conditions, in South-Eastern Kiskunság : (I/3) Meadow-type *Alopecurus pratensis*. This type gives much hay. On light sodaic meadow adobe : (I/4) Meadow type *Aster pannonicus*. Few genera, decreasing hay-yield.

(II) *Principal type on fresh soil. (Agrosteto-Caricetum distantis danubiale normale.)* It develops on plains higher than does the former type or in consequence of a sudden drainage of the ponds. The Agrostidin elements represent high percentage, the absence of Puccinellietalia genera indicates low soda-content. (II/1) Meadow-type *Phragmites* develops from reeds directly. (II/2) Meadow-type *Festuca pratensis* develops by drainage of swamps, it produces much hay. The traces of soda are present in the soil (0,03%). Further drying : (II/3) Type *Poa angustifolia*. In case of excessive pasturing (II/4) Type *Cynodon dactylon*. In case of overgrowth of weeds : (II/5) Type *Odontites rubra*. On regions with watery soil and much soda-content: (II/6) *Aster pannonicus*, elsewhere : (II/7) Meadow-type *Trifolium fragiferum-Taraxacum bessarabicum*. The meadow-type *Plantago maritima* appears on adobe-soil with high soda-content, where meadow type *Agrostis* can develop (0,15%).

(III) *Principal type on drying soil (Agrosteto-Caricetum dist. festucetosum pseudovinae)*. In case of extreme drainage the swampy meadows of creeping bent grass transform into pasture type *Festuca pseudovina* succesively. The types are (III/1) typicum. (III/2) *Linum perenne*, (III/3) *Festuca arundinaceae*, with favourable organic content, absence of water periodically. — In case of further drainage : (III/4) *Poa angustifolia* and (III/5) *Chrysopogon gryllus* types. At extreme pasturing : (III/6) Type *Trifolium fragiferum-Lotus tenuifolius*. On soil with relatively high soda-content here the type *Plantago maritima* appears too.

THE GEOGRAPHICAL DISTRIBUTION OF THE MELOIDS (COLEOPTERA)

Z. KASZAB

ZOOLOGICAL DEPARTMENT OF THE NATURAL HISTORY MUSEUM, BUDAPEST

On the basis of palaeontological finds, the recent genera of the Meloids had already developed in the Tertiary (Miocene, Oligocene). This fact is of the greatest importance from the point of view of faunal genesis. Concerning the recent range of the Meloids, there is a need of explanation concerning those lacks rather which may be observed in the faunas of Madagascar and Australia. Furthermore one has to account for the reduction of the Meloid fauna in the southern and southeastern areas of the Oriental region, the striking connections extant between the African and South American faunas, the extraordinary richness of the Sonorian fauna, and, last but not least, the high rate of variability of the Palearctic and Ethiopian Meloids.

Land connections between Madagascar and Africa were severed in the Miocene, therefore all Meloid genera common to Africa and which live in Madagascar, have lived also in Africa prior to the Miocene. It is a striking fact, however, that the many hundreds of species representing the tribe Mylabrini now flourishing in Africa and also some other characteristically African groups do not occur in Madagascar. The characteristically African groups absent from Madagascar have two sources of origin. Some of them represent an ancient African type with their centres of origin in the Cape Province and SW Africa, others again entered Africa only after the development of the Asian styep fauna related to the immense orogenesis of the Tertiary. To these latter belong the Mylabrini, as witnessed by the progressive series of their morphological features ; the progressive series of the characters being in connection with the direction of expansion of the tribe (progressive iterative evolution).

The remarkable connections between the African and South American faunas can be explained only on the basis of the Wegener theory. The cause of the impoverishment of the Oriental fauna must be sought for primarily in the ecological relations of the Meloids and their hosts. The primitive evolutional forms are wholly wanting from the fauna of Australia, due to geological reasons. No Meloids live in New Zealand. This may be ascribed to Australia having received its Meloid fauna in the period when it had already separated from New Zealand. This period is either the Upper Cretaceous or the Lower Eocene. Therefore the Meloid fauna of Australia can on no account be older than the Upper Cretaceous.

The variability of the Palearctic and African Meloids is due to the effects of climatal and vegetational changes during the geological ages. Even the Glaciations left their marks on the range of the Meloids, as best exemplified by the recent distribution of *Micromerus collaris* and its allied species.

TWIN MOSSES — A NEW INTERPRETATION OF DIOVIA CASES FROM HUNGARY AND AUSTRIA

I. GYŐRFFY

CSÁKVÁR

Abstract not received.

INVESTIGATIONS CONCERNING THE INTERPRETATION AND QUANTITATIVE ANALYSIS OF THE MODERN CONCEPT OF HABITAT

P. JUHÁSZ-NAGY

BOTANICAL INSTITUTE OF THE UNIVERSITY, DEBRECEN

The concept of habitat is nowadays understood to mean the sum total of all those ecological factors which may be regarded as significant for the distribution of a population, species or community. Because of the intricacy of interrelationships (replaceability of the said factors, co-existence of the communities, plasticity of ecological valence), only conclusions

based on a statistically adequate number of investigations can be regarded as satisfactory. The paper discusses the methods which make it possible to analyze the factors and determine the directly effective factor. Relationships of a stochastic nature are analyzed with the statistical method of correlation, and the fundamental requirements of statistically adequate analyses are defined. Habitat means a category of sampling. The principal requirements of sampling (homogeneity, independence and representative character of samples) cannot be satisfied unless the investigation is consistent as regards both its object and its execution. A detailed preliminary analysis is necessary for the determination of the factors to be analyzed in concreto. Habitat constitutes that part of the ecosystem which, in accordance with the object and the methods of the investigation, may be regarded as homogeneous. The concept of habitat is an abstraction, the synecological equivalent of the abstract idea of species and community. It is not individual, not concrete, nor can it be spatially circumscribed : relations of this kind belong to the category of the station.

CORRELATIONS BETWEEN THE SUCCESSION OF NATURAL GROVES AND THE FLOOD-PLAIN LEVELS ON THE GREAT HUNGARIAN PLAIN

I. KÁRPÁTI and M. PÉCSI

BOTANICAL RESEARCH INSTITUTE OF THE HUNGARIAN ACADEMY OF SCIENCES, VÁCRÁTÓT
and GEOGRAPHICAL RESEARCH GROUP OF THE HUNGARIAN ACADEMY OF SCIENCES, BUDAPEST

A co-ordinated field work has been in progress since 1957 for the purpose of examining correlations existing between the coenological and oecological system of the vegetation on the one side and the geomorphological system of the flood plain on the other. Investigations made in the field and the subsequent analysis of their results proved the existence of a strict parallelism between the two natural systems.

Terrace-morphological maps and sections based on PÉCSI's observations and surveys furnish evidence to show that, in accordance with the movement of its currents, the Danube of our days has two main flood-plain levels. One of them, the lower, has been and is still being formed by smaller inundations. It is variously developed by the river through shifting its main and collateral branches hither and thither, *i. e.* through the migration of its currents. The other, higher, level is formed by greater floods together with a change of the river bed.

The two levels display sharply distinct features from the viewpoints of geomorphology, soil science, water economy etc., and there exist, accordingly, two distinct groups of floral associations with significantly different characteristics.

Changes in the clearly distinguishable flood-plain levels go hand in hand with essential qualitative changes in the succession of the vegetation.

Fundamental conditions of oecology at the lower level allow but the growth of dwarf rushes *(Nanocyperion)* which tolerate long inundations and have a short period of vegetation. They are submerged even when the water level is medium or moderately low ; it is only at very low water that they come to stand on dry land, usually for 3 to 5 months in a year.

Only plant communities which can withstand being flooded during a period of 3 to 5 months per year can develop on the lower neoholocene level of the flood area. This level corresponds, essentially, to the natural habitat of the willow communities *(Salicion)* of natural groves. The members of its plant communities are *Salicetum triandrae, Salicetum purpurae* and *Salicetum albae-fragilis.* The highest habitat of the subassociations of willow-poplar groves occupy the upper transitory shelf of the flood area's neoholocene lower level : they constitute, also from a coenological point of view, a transition towards woods containing elm *(Ulmion)* associations. The habitat of plant associations which occupies the higher neoholocene level of the flood area is submerged only at a very high water elevation. Certain subassociations of the *Querceto-Ulmetum hungaricum,* an association widely distributed in the Hungarian flood plain of the Danube, indicate even the slightest level differences of the higher flood area with a fair precision. Stratigraphically, that facies of the association which is characterized by the *Rubus caesius (Querceto-Ulmetum hungaricum rubosum caesii)* may be regarded as corresponding to the lower transitory zone of the flood plain's neoholocene higher level ; in accordance with the change of flood-plain levels, it coalesces here and there in broader or narrower zones with that subassociation, *i. e.* the *Salicetum albea-fragilis cornetosum sanguinei,* of willow-poplar groves which occupies the highest habitat in such natural groves.

There exist islandlike old-holocene terraces in the inundation area where subassociations *(Querceto-Ulmetum hungaricum asperuletosum, Q. U. h. convallarietosum)* are encountered which may be regarded as transitions to *Querceto-Carpinetum* and *Convallario-Quercetum.*

HUNGARIAN ASPECTS OF MUSHROOM OECOLOGY

Z. KALMÁR

STATE INSTITUTE FOR QUALITATIVE TESTING OF AGRICULTURAL PRODUCTS, BUDAPEST

On account of Hungary's specific geographical situation and the sharp seasonal contrasts of her climate, the country's mushroom flora differs in many respects from that of other European countries. Under the influence of special climatic conditions and other oecological factors, many mushrooms grow in Hungary in habitats, in a manner and at a time different from the conditions in adjacent regions. Therefore, if we wish to specify the conditions in which the different species grow and develop, we must not content ourselves with the literary reports of non-Hungarian authors but have to base our data on the evidence of observations made in this country. Led by such considerations, the present author — aided by a number of outside collaborators — has been engaged for more than 20 years in making systematic observations of this kind and succeeded in collecting more than 20 000 data which give a fairly accurate picture of the manner and date of the occurrence of all species of fungi in Hungary. These observations made it possible to compile a comprehensive work which, while containing oecological findings of general validity applies these to Hungary's special conditions and is similar in its contents and arrangement to RAUTAVAARA's book on Finland's mushroom flora.

STUDIES ON THE PHENOLOGY, MORPHOLOGY AND THE CONTENT IN ACTIVE PRINCIPLES OF NATIVE AND FOREIGN CHAMOMILLES

IRENE SÁRKÁNY-KISS, ELISABETH SZABÓ-NAGY and E. TYIHÁK

RESEARCH INSTITUTE FOR MEDICINAL PLANTS, BUDAPEST

With a view to producing chamomille of good quality and suitable to meet the requirements of our foreign customers, our Institute carried out investigations on the cultivation resp. the breeding of chamomille. Our researches were focussed on the quantity of active principles (volatile oils, azulene, cholin) in plants of different origin, all in all in 8 drugs from which 3 were of Hungarian, 2 of Bohemian, 1 of Sowiet, 1 of Bulgarian and 1 of Portuguese origin. A detailed phenological and morphological survey has been made during the period of vegetation on the plants raised in the experimental garden of the Institute, while from the beginning of flowering, inflorescences have been harvested on three occasions for chemical examinations. The somewhat modified distillation method of KAISER and HASENMEIER was applied. Parallel with the analysis of the bulk, however, an individual selection was undertaken in all stands, partly on the basis of a favourable habitus, partly on that of the proazulene content ; for the latter the quick method which STAHL worked out for *Achillea* (EP-reagent) has been employed. Results of both kinds of chemical examinations were summarized in diagrams and found to show — as regards the content in azulene of the single stands — the same order of succession. Thus the field chamomille proved to be the best (171 drug mg%), the Bohemian drug showed nearly the same values (166 mg%), while the Bohemian of Brno yielded 146 mg% and the Hungarian of Vácrátót 140 mg%. A surprisingly low value (22 mg%) was found in the Bulgarian drug, while the Portuguese proved with both methods to be completely devoid of azulene. The cholin content of the plant has been examined by applying the method worked out by BAYER and his collaborators. Here the highest values (0,43%) were found to be in the drug originating from Vácrátót, the lowest values (0,19%) in the material received from the Medical Plant Enterprise, while the rest varied between 0,23—0,31%. As regards the inflorescence, an interesting feature is to be mentioned : the receptacle and the involucre contained 0,64% cholin, but in the flower parts only 0,26% was found.

THE OCCURRENCE OF ANTHRAGLYCOSIDES IN KNIPHOFIA UVARIA

L. Boross

DEPARTMENT OF CHEMISTRY, MEDICAL UNIVERSITY, PÉCS*

According to Ferenczy the seed coat of *Kniphofia uvaria* contains an antibacterical substance. The active compound, isolated by column chromatography, on the basis of its chemical and antibacterial properties proved to be identical with 1,8-dihydroxyanthraquinone carboxylic acid. In addition to this substance the presence in the seed coat of at least two further neutral anthraquinone derivatives was demonstrated. The latter compounds do not contain free OH-groups in position. Both the acidic and neutral derivatives occur partly in free state and partly in glycosidic linkages.

The amount of the acidic anthraquinone derivate of the seed coat is about 0,2—0,4 per cent. The amount of the neutral derivatives is 8—10 times less.

The other parts of the plants also contain anthraglycosides. The total anthraquinone content of the wall of the fruit and the stem is approximately half of the anthraquinone content of the seed coat, and consists mainly of neutral derivatives. The root system contains exclusively neutral derivatives.

The chemical analysis of the neutral derivatives is in course.

DISCOVERY OF ORDOVICIAN CORMOPHYTA

P. Greguss

BOTANICAL INSTITUTE OF THE UNIVERSITY, SZEGED

Up to the present it has been generally accepted that Psilophyta, the primaeval shrubs of the Devonian, were those simplest Cormophyta from which the three different groups of the Pteridophyta, namely the Lycopsida, Pteropsida and Sphenopsida descended. There were and are however authors who regard not only the Pteridophyta but also the Psilophyta as representatives of several widely different main types and think that these two might have evolved from several still more primitive ancient types.

Zimmermann's "teloma theory" traces the three principal kinds of branching of the Pteridophyta, *i. e.* the monopodial, dichotomic and verticillate, back to the dichotomy of primaeval shrubs, while some authors regard the Bryophyta as a reductional form of the Pteridophyta.

Recent finds unearthed in Poland will surely cause a modification of these theories. Kozlowski succeded in isolating from the "Ostseekalk" minute plantlets which are undoubtedly of Ordovician origin, and the author has received them for scientific analysis. It has been possible to prove that these minuscular Cormophyta (size 1 to 8 mm) represent organisms even much simpler than the Psilophyta. Not less than 8 to 10 very distinct species have been established.

The entire external and internal morphology of the plantlets was subjected to careful examination. It was found that these minute organisms possessed roots with root-hair and primitive bundles of conductive tissue; the plants were either devoid of leaves or provided with small scales only instead. The plants in question are in a certain way reminiscent of Psilophyta. Therefore, these Ordovician Cormophyta, that lived in a period prior to that of the Psilophyta, have been termed "Propsilophyta" by the author of this paper.

The fact that, as early as in the Ordovocian, two different and approximately equally developed types of ancient mosslike plants lived side by side is of great phylogenetic significance. Because of its similarity to the monopodially branching cylindrical-bodied Musci, one of them has been termed Musciphyton, while — on account of its similarity to the dichotomically branching flat-bodied Hepaticae — the other is called Hepaticaephyton by the author.

* Present address: Biochemical Institute of the Hungarian Academy of Sciences, Budapest.

PHYTOGEOGRAPHICAL STRUCTURE OF TRANSDANUBIA

Z. KÁRPÁTI and T. PÓCS

DEPARTMENT OF BOTANY, HORTICULTURAL COLLEGE, BUDAPEST

and

DEPARTMENT OF BOTANY, NATURAL HISTORY MUSEUM, BUDAPEST

No other part of Hungary has given rise to so many problems of phytogeographical division and so numerous controversies as Transdanubia regarded as a geographical unit.

This is due to the fact that the central part of Transdanubia is traversed by a range of mountains of medium height (the "Hungarian Medium Range") from Southwest to Northwest, the greatest part of which is bounded by the "Kisalföld" ("Small Hungarian Plain") towards the Northwest, and by the Lake Balaton and a part of the Great Hungarian Plain towards the Southeast, while the last spurs of the Eastern Alps are encountered in the western area of Transdanubia. Comparatively few problems arose in connection with these parts, whereas many a problem is awaiting solution in connection with the region between the spurs of the Alps, the "Hungarian Medium Range" that belongs to *Pannonicum*, and the Great Hungarian Plain which is regarded as a transitory region belonging to *Pannonicum* and is called *Transdanubicum*, *i. e.* Transdanubia in a phytogeographical sense.

Recent investigations have led to the following phytogeographical division of Transdanubia :

To the *Pannonicum* belongs in Transdanubia the "Medium Range" (which is regarded as belonging to the Ancient Mátra = *Matricum)*, with the *Balatonicum*, *Vesprimense*, *Pilisense* and *Visegradense* as floral districts. It should be noted that the region of Bakonyalja with the area of Uzsa-Sümeg and the "Island Hills" (Somló, Kis-Somló, Ság, Hercseg) belongs to the *Balatonicum* and not to the *Vesprimense*. The boundaries of the "Kisalföld" ("Small Plain" = *Arrabonicum)* are now different from those accepted hitherto.

The *Transdanubicum* includes 7 floral districts. Two of them, *viz.* the *Laitaicum* in the North and the *Sopianicum* in the Southeast, have a markedly Pannonian character, while the flora of the other five districts displays many transitory features. The greater part of the counties South-Sopron and Vas belongs to the floral district *Castriferreicum*, whereas most of Göcsej constitutes part of the floral district *Petovicum* in Yugoslavia. Both floral districts have a character that shows transitory features between the *Noricum* and the *Pannonicum* so that the comprehensive term *Praenorico-Transdanubicum* should be applied to them.

The floral districts *Saladiense* (including the moorland of Tapolca), *Somogyicum* and *Kaposense* form a transition from the *Illyricum* to the *Pannonicum* which justifies the application of the term *Praeillyrico-Transdanubicum*.

To the *Noricum*, a representative of the Alps, belongs the hilly region west of Sopron and Kőszeg as part of the floral district *Ceticum*, furthermore the Vendvidék, an area west of Szentgotthárd, which forms part of the floral district *Stiriacum* that belongs to the *Noricum* and extends into Hungary.

PHYTOGEOGRAPHY OF THE BÖRZSÖNY MOUNTAINS IN THE LIGHT OF MOSSES

Á. BOROS and L. VAJDA

BUDAPEST

Formerly, it was hardly possible to demonstrate any essential difference between the moss-flora of the Visegrád mountains and that of the Börzsöny mountains. The ridges north of Csóványos and Magosfa are strikingly rich in liverworts, and quite a number of mosses growing on them is identical with those encountered in the Carpathians. Worthiest of note are those species which occur rarely in the Carpathians even, and have been described from but one or two stations of the North Carpathians, such as the *Marsupella ustulata*, M. *sprucei* and *Campylosteleum saxicola*. The Carpathian character of these ridges and rocks is further enhanced by certain species which are rare in mountains of medium height but more frequent in the Carpathians, such as the *Marsupella emarginata*, *Lophozia heterocolpos*, *Brachyodontium trichodes*, *Rhacomitrium protensum*, *R. heterostichum*, *Bartramia norvegica*, *Blindia acuta*, *Brachythecium plumosum*, etc. Therefore, the rocks on the northern slopes of the Börzsöny mountains constitute the same kind of crevices of microclimate as do, for instance, the Saskő

and Sombokor in the Mátra mountains. The Carpathian character of the flora in the Börzsöny is further borne out by certain ferns and seed plants we have recently discovered, *e. g.* the *Polystichum lonchitis, P. paleaceum, Stachys alpina, Knautia silvatica,* the *Vaccinium myrtillus* in a new place of growth, the *Pleurospermum austriacum,* and *Petasites albus,* most of which were unknown in the Börzsöny. These new data make it evident that the flora of the Visegrád mountains is widely different from that of the northern slopes of the Börzsöny mountains inasmuch as the latter is much richer in alpine, Carpathian species.

STUDIES ON CELL METABOLISM IN THE ROOT TIP OF SUGAR BEET

M. Maróti

DEPARTMENT OF PLANT PHYSIOLOGY OF THE EÖTVÖS LORÁND UNIVERSITY, BUDAPEST

and

BIOLOGICAL STATION, ALSÓGÖD

In the cells of root tips of some sugar beet varieties (used also as partners in crossings of Hungarian sugar beet breeding experiments) the increase in dry matter, the change in cell number, and in total (P) and nucleic acid phosphorus (NA—P) was compared in various zones of the root and the results obtained were calculated per cell. The estimation of phosphorus was made colorimetrically (Pulfrich photometer) based on the reaction of phosphorus with molybdenic acid. Nucleic acids were extracted and fractionated according to the procedure of Ogur and Rosen and determined on the basis of the phosphorus content of the fractions.

The diploid varieties and their triploid hybrid differ greatly in the increase in weight, cell number, content of phosphorus and NA—P. The data of the triploid hybrid are partly intermediary between those of the two parents, partly surpass them. The content of dry matter, expressed as per cent of fresh weight, is highly different in the two diploid varieties (100% difference).

Calculation of the values obtained per cell indicates that the diploid varieties differ mainly in their content of NA—P and DNA—P. The cells of the triploid hybrid contain 2 to 4 times more NA—P than those of the parents. The DNA—P content of the cells is not a constant property. This is indicated by the fact that the cells in the root tip contain less DNA—P than those located at a greater distance from the root tip. In addition, there is no proportionality between the DNA—P content of the cells of diploid varieties and that of the triploid hybrid cells derived from them. Therefore, it may be assumed that the DNA—P content of somatic cells, in addition to the chromosome number, also depends on the differentiation and developmental stage of the cells.

QUANTITATIVE AND QUALITATIVE CHANGES IN FREE AMINO ACIDS OF RICE PLANTS INDUCED BY UNFAVOURABLE CONDITIONS

F. Zsoldos and I. Szalai

DEPARTMENT OF PLANT PHYSIOLOGY, UNIVERSITY OF SZEGED

One of the main problems in many rice-growing countries is the periodical outbreak of the browning disease of rice. The successful control of the disease, which is partly an agrochemical and plant breeding problem, also necessitates studies on the physiological change taking place in the rice plants under the effect of unfavourable conditions promoting disease development.

Field experiments (ÖRKI, Experimental Station for Rice Breeding, Kopáncs) indicated a differential behaviour of rice varieties as far as the effect of artificial cooling upon the free amino acid content of root exudates is concerned. Artificial cooling (12—14° C) and especially the natural cold and cloudy days (16—17° C) during the later phases of the experiments resulted in the disappearance of γ-aminobutyric acid in the root exudate of the rice variety "Dunghan Shali" known as a variety susceptible to the browning disease. By contrast, no appreciable change in γ-amonobutyric acid was observed under the same conditions in the

resistant variety "Precoce Allorio". "Dunghan Shali" plants held on higher temperature (22—24° C) did not show any change in their amino acid composition.

On the basis of the above observation it is reasonable to suppose that the changes in γ-aminobutyric acid content due to low temperature and the resistance of the rice varieties to the browning disease are somehow interrelated. This conclusion is justified if we accept the widespread opinion that low temperature and cloudy weather favour disease development. Our experiments also indicate that a more important role must be attributed to γ-aminobutyric acid than previously suggested.

The investigations were extended to the study of free amino acids of "Dungham Shali" grown in soils fertilized with supraoptimal N-doses (10 q Linz-salt/cad. yoke). A special attention was devoted to alanine. It has been established that the amount of alanine is abnormally increased upon the supraoptimal nitrogen treatment. This observation is in line with previous studies on the probable role of alanine in NH_3-detoxification by rice tissues.

RIPENING OF THE GRAINS IN THE EARS OF MAIZE

J. WALGER

INSTITUTE OF SOIL SCIENCE AND AGROCHEMISTRY, HUNGARIAN ACADEMY OF SCIENCES, BUDAPEST

Abstract not received.

ON THE MECHANISM OF THE HYPERSENSITIVE REACTION OF INFECTED PLANTS

G. FARKAS, F. SOLYMOSY and Z. KIRÁLY

RESEARCH INSTITUTE FOR PLANT PROTECTION, BUDAPEST

The hypersensitive reaction (lesion formation) of plant tissues attacked by parasitic fungi or viruses is often a source of resistance against the invading parasites. The mechanism of action of this reaction was studied on various wheat-rust and tobacco-virus host-parasite combinations. In all cases when the infection resulted in hypersensitive reaction, the activity of polyphenolases (PPO) in the tissues underwent an immediate, marked (over 100%) stimulation (rust-infected resistant wheat varieties and host-virus combinations leading to the formation of local lesions).

When the parasite has spread systemically (rust-susceptible wheat varieties and systemic virus infections) the PPO activity increased only during the later stages of disease development. In resistant varieties the increase in PPO activity was confined to a restricted area around the lesions, whereas in susceptible ones PPO was activated in the whole infected leaf. The accumulation of quinones was also demonstrated by histochemical techniques in and around the local lesions in resistant plants whereas no quinone accumulation was observed in susceptible tissues upon infection. This suggests that in the resistant tissues, at the entry of the parasite, the balance between the oxidizing and reducing systems of the cells is upset and consequently quinones accumulate due to the increased PPO activity which cannot be counteracted by the reducing systems. This idea is supported by the observation that reducing substances (ascorbic acid, glutathione, cysteine) infiltrated into tobacco leaves inhibit lesion formation. Furthermore, the amount of reducing substances decreases in the tissues responding to infection with hypersensitive reaction apparently due to the accumulation of quinones known to react chemically with a number of reducing substances of the tissues, the bulk of which being, however, ascorbic acid. No change or increase in ascorbic acid content was experienced in infected susceptible tissues.

A NEW POSSIBILITY OF PRODUCING SUPERSELECTIVE HERBICIDES

L. Ferenczy and B. Matkovics

DEPARTMENT OF PLANT PHYSIOLOGY AND DEPARTMENT OF ORGANIC CHEMISTRY, UNIVERSITY OF SZEGED

It has been observed in our laboratory that some auxin precursors *(i. e.* 3-indoleacetonitrile, 3-indoleethylamine) exhibit a selective growth promoting effect. On the basis of the selectivity of indole derivatives as auxin precursors we came to the idea that probably derivatives of 2,4-dichlorophenoxyacetic acid, chemically related to the indole compounds, will also possess a selective effect. If this proved to be true -- as can be suggested on the basis of preliminary studies — a new way would be open for the production of superselective herbicides, *i. e.* compounds able to eradicate dicotyledonous weeds in dicotyledonous crops without damaging the cultivated plants.

The weed killing effect of 2,4-dichlorophenoxyacetonitrile (2,4-DN) and 2,4-dichlorophenoxyethylamine (2,4-DEA) has been studied and the results were compared with those obtained with 2,4-dichlorophenoxyacetic acid (2,4-D). The sensitivity of nine cultivated plant species (all dicots) was assayed. Three-week-old plants were sprayed. The concentration used was 500 g/ha.

All the plant species tested were heavily damaged by 2,4-D. In 2 to 3 weeks a complete eradication was experienced. 2,4-DN exhibited a similar range of activity, except that cucumber plants were only slightly and temporarily damaged. 2,4-DEA was completely ineffective against hemp but eradicated the other plants involved.

2,4-DEA—HCl was synthesized. The effect of this compound is identical with that of 2,4-DEA. Experimental sprayings (1 kg/ha) indicated that none of the 8 investigated hemp varieties is damaged by 2,4-DEA—HCl. By contrast, a successful control of various dicotyledonous weeds of hemp plots was achieved *(Convolvulus arvensis, Amaranthus albus. A. retroflexus, Lepidium draba* and *Sinapis arvensis).*

COMPARATIVE STUDIES ON VEGETATIVE DEVELOPMENT OF DI- AND TETRAPLOID TOMATOES

Magdolna Kovács-Schneider

DEPARTMENT OF PLANT BREEDING OF THE UNIVERSITY OF AGRICULTURE, GÖDÖLLŐ

The literary data dealing with polyploidy are highly contradictory. The present studies were conducted to compare the properties of tomato varieties obtained from the Genetical Institute of the Hungarian Academy of Sciences in 1957. This plant material consisted of di- and tetraploid forms of wild, and cultivated tomatoes and of some intermediary types. We expected to obtain, by this comparative work, some data of theoretical importance but we also wanted to screen the material for economically valuable properties.

It was evident that polyploidy is not associated with uniform changes. It results in higher variability of the plants leading, therefore, to a valuable starting material for further breeding work. All polyploid wild species exhibit larger seeds. In 50% of the cultivated plants polyploidy is also associated with an increased seed-size. Intermediate tpyes occupy an intermediate position: 75% of their polyploid forms possess larger seeds. 50—50% of the cultivated and intermediary species is characterized by an increased dry weight. 66% of the cultivated species and 75% of the intermediary tpyes exhibit a higher phosphorus content. Earlier germination was observed in 40—50% of the cultivated species, whereas only 20% of the intermediary types possessed this property. A higher rate of development was observed in most polyploid tomato varieties belonging to the intermediary type (70—80%). 30—50% of the cultivated species also exhibited a higher rate of development. The cotyledons of the polyploids are short and narrow or they are similar to the cotyledons of diploids. 50% of the polyploids in all the three groups exhibited longer and wider leaves than the diploids. An earlier appearance of new leaves has been observed in 2 cultivated and 2 intermediary formes. Flowering and fruit setting of these plants occurs simultaneously with the flowering and fruit setting of diploids. The size of tetraploid fruits is smaller, they contain less seeds. Properties that seem to be economically advantageous: larger seeds, more uniform emergence, faster germination and growth during the early developmental processes, reduced number of seeds (this might result in an increase in dry weight and improved quality). The studies are continued.

THE FORMATION OF THE SO-CALLED "INFERIOR" OVARY IN THE UMBELLIFERAE, ACCORDING TO HISTOGENETICAL EXAMINATIONS

S. SÁRKÁNY

DEPARTMENT FOR APPLIED BOTANY AND HISTOGENETICS,
EÖTVÖS LORÁND UNIVERSITY, BUDAPEST

Along with preliminary studies on 25 genera of the family of Umbelliferae, the pistil of *Foeniculum vulgare* MILL. has been thoroughly examined. By the successive appearance of petal-, stamen-, and carpel-primordia, the authentic nodal level of the flower leaves is clearly revealed. As growth progresses it appears that only the meristematic zone lying above the nodal level takes part in the formation of the ovary-wall ; namely, the development of the petal-, stamen- and carpel-primordia proceeds congenitally, partly by a peripheral meristem, partly by intercalar growth and thus the insertion-level of the petals keeps moving away from the genuine nodal level. In the meantime a greater part of the ovary is also formed. The formation of the septum dividing the two loculi is to be ascribed to a vigorous development, a peltate growth of the transversal zone of the carpel-primordia. The number (10) of the main bundles of the ovary-wall is determined by the procambial vascular system belonging to the 5 petal-, and 5 stamen-primordia, hence there are no so-called "axillary" bundles to be found. In all stages of development the level (the authentic nodal level) where the tissues of the ovary-wall, first of all its vascular system cross over into the furcate receptacle is quite conspicuous and visible even with the unaided eye. As a final result it was found that the pistil forms typically by the coalescence of two carpels, it is even possible to follow on the outside of the ovary the indenture where the edges of the two carpels touch, while the same is revealed by a deeply staining tissue-band running down almost to the base. On the basis of all the above details the conclusion was reached that in *Foeniculum vulgare* MILL., as well as in other related genera under examination, we have to do with an ovary of a strongly progressive character, which by no means can be considered as an "inferior" ovary.

STUDIES ON THE POSSIBILITY OF DISTINGUISHING VINE STOCK VARIETIES BY HISTOLOGICAL INVESTIGATION OF CANES

A. HEGEDŰS

AMPELOLOGICAL RESEARCH INSTITUTE, BUDAPEST

Studies on the possibility of distinguishing vine stock varieties on the basis of the anatomical structure of canes were carried out on 12 varieties during 1958. The following *Vitis* sortiment was subjected to detailed studies : *riparia* (1), *rupestris* (1), *berlandieri* x *riparia* (3), *longii* x *riparia* (1), *riparia* x *rupestris* (2), *vinifera* x *berlandieri* (1), *vinifera* x *rupestris* (2), and *vinifera* x *riparia* x *rupestris* (1). One cane each of 10—10 vine-plants of each variety were selected and cross sections were prepared from the 10th internode. There are no qualitative differences in the anatomical structure of the varieties investigated. Therefore, we tried to establish quantitative differences. The following data have been compared : the short and long diameter of pith and the quotient of them ; the lowest and highest values of thickness of xylem and the quotient of them ; the ratio of xylem to pith ; lowest and highest values of thickness of the living phloem and the quotient of them ; the average number of tangential phloem fiber bands ; maximal diameter of tracheas in the smallest vascular bundles of the wide side and in the largest vascular bundles of the narrow side of the cane and their ratio. A difference of 4 m between the averages counted for each variety was regarded as significant. Thus significant differences were found between the pairs of varieties to be compared concerning 1—9 characters investigated. The data presented refer to plants deriving from a single place and the studies were conducted only for a year, therefore, the identification of vine cane pieces of unknown origin by the method described above does not seem to be possible.

LIGHT AND ELECTRONMICROSCOPIC INVESTIGATION OF THE CELL WALL IN CHARACEAE

L. Fridvalszky and B. Lovas

INSTITUTE FOR APPLIED BOTANY AND HISTOGENETICS, EÖTVÖS LORÁND UNIVERSITY, BUDAPEST

and

RESEARCH INSTITUTE FOR TECHNICAL PHYSICS OF THE HUNGARIAN ACADEMY OF SCIENCES, DEPARTMENT FOR MICROMORPHOLOGY, BUDAPEST

Seen through the electron microscope, the basal walls of the internodal cells of the stem invariably appear to be porous in the species that belong to the genera *Chara, Tolypellopsis, Nitella* and *Tolypella* (of the family *Characeae).* The pores display a characteristic arrangement developing in two, sometimes in three grades. Regular polygonal areas, so called pore fields, on the convex basal walls — visible even under the stereomicroscope — constitute the largest structural units. Crowded into larger or smaller groups, the pores form secondary structural units. Pores have an average diameter of 400 mμ and a shape of a more or less distorted circle bounded by a texture composed of cellulose microfibrils. As regards their order of magnitude, pores are at the extreme limit of light-microscopical visibility while seen under the phase microscope not only pore groups but even individual pores can be distinguished. In the smaller nodal cells walls communicating with the basal wall of the axial internodal cells were also found to contain pores, and a similar observation was made in respect to the communicating walls of the internodal and nodal cortical cells. No such structure was discovered in the lateral walls of internodal axial and internodal cortical cells. According to our present knowledge, the pores are the sites of threads of cytoplasm, the so-called plasmodesma, which form intercellular bridges: they ensure the uniform biological activity of the plant body and may be said to correspond to the submicroscopic porous structure encountered in the cell wall—chiefly in the pits—of plants belonging to the higher orders.

BASIC PRINCIPLES OF A NEW AUTOMATIC ANALYZER IN PLANT HISTOLOGY

J. Stieber

INSTITUTE FOR APPLIED BOTANY AND HISTOGENETICS, UNIVERSITY OF BUDAPEST

Measurings in plant histological respectively xylotomical examinations may generally be carried out by rather simple methods. Should one, however, examine the variations and correlations of quantitative features, a large number of measuring and calculating work has to be coped with. In past years adequate microscopical auxiliary instruments have been developed for measurements of this kind which we have also made use of in the course of our studies on quantitative xylotomy, going on now for many years. The principles of our conception aiming at a further perfecting of the present methodology shall be presently outlined. The block schematic of a universal automatic tissue-analyzer is as follows. The microscopic picture is divided electronically into its picture elements. The outgoing signals of the analyzing unit modulate a wobbling frequency of a different sign and these signals are transmitted onto a filtering and forming stage. From the latter measurable pulses are transmitted in dependence on the task to be carried out, partly to a controllable limiter and discriminator, partly to dividing, gating, rectifying resp. demodulating circuits. These transmitted and already uniform pulses reach yet another dividing stage and are amplified before coming to a registering device, or else the appropriate signals are retained with the help of an oscilloscope on a graph or a series of graphs. With this instrument the analyzing of a picture would take maximum 50 seconds but it would be possible to reduce this time to 50 or even to 25%, thus accelerating the measuring time compared with older methods 100—200 fold. By the above described circuit diagram a great variety of histological measurements may be carried out and actually certain correlations and regularities of the quantitative features might be graphically or numerically expressed, instead of using intricate mathematical calculations.

Abstracts of papers read at the sessions of the section B

CYTOLOGICAL OBSERVATIONS IN THE GENUS RANUNCULUS

B. GYŐRFFY

INSTITUTE OF GENETICS, HUNGARIAN ACADEMY OF SCIENCES, BUDAPEST

A study of the comparative karyology of the genus *Ranunculus* was undertaken by use of 24 species available and representative of several sections of the genus. All of the species possess an asymmetrical karyotype, however, the conspicuous differences in the external morphology of the karyotypes can be expressed in terms of the proportion of the chromosomes with subterminal centromeres, and of the increasing differences in relative size between the largest and the smallest chromosome of the set. A classification of the species into categories of increasing asymmetry was achieved as suggested by STEBBINS (1958). The less specialized species with the largest relative number of V or J shaped chromosomes are diploids with the basic number 8. A progressively increasing asymmetry was found in the species with the basic number 7. The evolution of specialization in centromere position and in size differences reaches its climax in the polyploid species. These changes in the karyotype appear also to be associated with alteration of the life cycle, because the species with highly specialized karyotypes are the reduced annual ones.

PARALLEL MUTATIONS IN POLYPLOID SERIES OF WHEAT

Z. BARABÁS

AGRICULTURAL RESEARCH INSTITUTE OF THE HUNGARIAN ACADEMY OF SCIENCES, MARTONVÁSÁR

In addition to significant differences great many similar features are equally shown by plant-species of the wheat polyploid series. The knowledge how these similarities have developed is an important factor in the study of species-formation.

Irradiations carried out for five years on Hungarian wheat varieties present an interesting picture. In the course of investigations conducted in 1957 at three polyploid levels on four wheat species (*Triticum aestivum*; *T. carthlicum*; *T. timopheevi*. *T. monococcum*) concerning eight crop-forming quantitative factors (stem length, spike length, spikes per stem, spikelets per spike, spike compactness, grains per spike, grains per spikelet, 1000-grain weight) the following conclusions were drawn. As regards the characters examined no important difference could be found between the mean value of the irradiated material and that of the control. *On the other hand dispersion values are generally increasing and more so at the lower ploid-levels.*

As regards the qualitative factors the highest variability (26 mutants) was obtained precisely in the opposite direction — on the *hexaploid level.* It was lower at the tetra- and diploid levels (12 and 11 types respectively). The "*vavilovoid*" form segregated from the tetraploid *Triticum carthlicum* in X_3 was remarkable among them and proved to be a *parallel mutant of the hexaploid T. vavilovi* (BARABÁS, 1959).

It is made comprehensible by these investigations, that STADLER analyzing *quantitative* chlorophyll-mutants found a *negative correlation* between the *ploid level* and *frequency of mutations*, whereas MCKEY testing mainly by means of *qualitative* properties found this *correlation to be direct.*

Therefore at present only the combined examination of quantitative and qualitative properties seems to be suitable for the determination of the extent of mutability. These investigations should, however, be completed by further experiments.

GENETIC STUDIES ON A PHYTOPATHOGENIC XANTHOMONAS

B. Győrffy, S. Igali, I. Kállay, Ilona B. Kárász, Z. Klement and K. Szende

INSTITUTE OF GENETICS OF THE HUNGARIAN ACADEMY OF SCIENCES, BUDAPEST

and

RESEARCH INSTITUTE FOR PLANT PROTECTION, BUDAPEST

Our investigation has started recently with *Xanthomonas phaseoli* var. *fuscans*, a bacterium adventageous in several respects to attempt such a genetic study. Its bacteriophage was first in Hungary isolated by one of us. The first problem was to obtain strains with well defined markers. For this purpose we used ultraviolet irradiation which resulted in asparagin- and asparagin + prolin-requiring mutants. The resistance to streptomycin, chloramphenicol and penicillin was developed by the serial transfer technique. The development of a high level of resistance was rapidly attained, however, the viability of these resistant variants was limited. Stable and high degree of resistance to streptomycin was obtained by isolation of so-called "one-step" mutants. Phage-resistants were also readily isolated.

In the transformation experiments we used the streptomycin resistance as marker. The donor cells were lysed with sodium-desoxycholate and the transforming deoxyribonucleic acid was prepared with some modification. The frequency of transformants was not as high as reported by Corey and Starr (1957), however, we could eliminate the disturbing occurrence of persisters in our experiments. Our attempts either to isolate lysogenic strains or to induce lysogenization have failed as yet. Meanwhile another bacteriophage was isolated, characterized by an altered plaque-type and host response, too.

CHANGE IN THE DIMENSIONS OF THE TETRAHYMENA PYRIFORMIS UNDER THE EFFECT OF PENICILLIN, AND THE TRANSMISSION OF THE CHANGE TO THE OFFSPRING

G. Németh and L. Csík

INSTITUTE OF MEDICAL BIOLOGY OF THE MEDICAL UNIVERSITY, SZEGED

Both length and width of the *Tetrahymena pyriformis* will vary with the amount of penicillin contained in the medium on which it is grown. The smallest dose of penicillin used in the experiments was 100 U/ml, and it reduced the body length to half its original value. 500 control animals were measured and the mean value of their length — 39,0 μ — was regarded as the standard of reference. Animals grown on a medium containing 500 U/ml penicillin reached a length of 22,3 μ only. Higher concentrations of penicillin slowed down the rate at which body length decreased, and animals kept on media with the highest concentration of penicillin applied in the experiments (2000 U per ml) reached almost the length of the controls.

Mean values in respect of width showed the same tendency. The mean value of width was 15,5 μ, *i. e.* approximately half of the normal value (22, 3 μ), at low penicillin concentrations. Increased concentrations went hand in hand with an increase in width which nearly reached the normal value at high concentrations. Statistical computations prove these data to offer a solid basis of evaluation.

Another group of experiments yielded the result that the changed dimensions appeared through several generations even if the medium contained no penicillin. We raised *Tetrahymena* in a medium that contained a high dose of penicillin, and retransferred part of these animals to a medium without penicillin and part of them to one which contained penicillin. This done, the dimensions of the animals were measured after a few days and it was found that both length and width of the animals retransferred from the penicillin-containing to the penicillin-free medium, as also their variation curve, were almost completely identical with the dimensions of those animals which had been retransferred to the penicillin-containing medium.

ON THE INHERITANCE OF FASCIATION OF EARS OF MAIZE

L. Daniel and Edith Váróczy

INSTITUTE OF GENETICS OF THE HUNGARIAN ACADEMY OF SCIENCES, BUDAPEST

Some teratological phenomena of ears of maize were investigated in diallel crosses of the following lines selfed 7, 8 years : 4- and 8-rowed flint maize (P4, P8), 12- and 18-rowed dent maize (P12, P18), and an approximately 40-rowed popmaize (P40), with fasciated spherical ears. Studies have been made on the parents, on the F_1 and F_2 generations and on the two backcross generations (B_1 and B_2). Branched ears, — although the frequency of their occurrence exhibited the highest value among the parents in the case of P40, — showed no definite correlation with the number of rows and was inherited independently of the fasciation. The values of the summarized combinations, which are showing the highest frequency of the occurrence of branched ears in the offsprings of P18 and the lowest one in the P8 offsprings, all exceeded the values expected on the basis of the parents, with the exception of P8. Fasciation (Y) occurred in P40 and also in its F_2 and B generations. The frequency of its occurrence increases with the number of kernel rows (X) Y_{F_2} (range : 9,22—61,84) = 0,033 X^3—1,709 X^2 + 30,195 X—166, 499 ; Y_B (range : 22,22—64,71) = 0,137889 X^3—11,044821 X^2+ + 295,41685 X — 2610,8939) and suggests a quantitative inheritance. The cross P18 × × P40, in no accordance with the others, exhibited in the F_1 almost exclusively fasciated ears (93—100%) ; in the back crosses : F_1 × P18—51%, F_1 × P40—65% ; and in the F_2 generation 62%. Since in P18 and its other combinations the highest frequency of fasciation was 2,78% (P18), it may be assumed that P40 possess a monogenic recessive factor (fsfs), whereas in P18 a dominant and a suppressor factor or factors should be present (FsFs Su—Fs Su—Fs).

NEW FORMS IN ZEA X EUCHLAENA HYBRIDS

A. Kovács

DEPARTMENT OF PLANT BREEDING OF THE UNIVERSITY OF AGRICULTURE, GÖDÖLLŐ

Hybrids have been produced between *Euchlaena mexicana* and *Zea mays* L. *saccharata* Kcke and *Zea mays* L. *dentiformis* (Dániel, Bálint and Kovács). The hybrids obtained between the genera mentioned above segregate even in the F_5. During segregation new characters arise (morphological features of the whole plant, the form of cobs, the form of kernels etc.) The genetic material is enriched by this crossing compared to the lower variability of crossings between sorts. Rapid changes can be induced by backcrossing and top-crossing and plants similar in many respect to the cultivated type can be obtained, which plants are evidently useful from the point of view of practical plant breeding as well. In our plant breeding program the hybrid material is used for changing the chemical constituents (protein content and quality) and to produce a silo-type. The chemical composition of the hybrids undergoes considerable changes. The dry weight increases, the carbohydrate, protein and amino acid content is also altered. The further crossing of the hybrids is easy ; however, the first *Zea* x *Euchlaena* crossing was rather difficult and could be realized only by short-day treatment in greenhouse. According to the preliminary investigations the combining ability of the hybrids (crossings with tester plants) is different ; nevertheless, lines with good combining ability have also been obtained. The plants deriving from the basic crossing can serve only as a starting material for further plant breeding work, as the disadvantageous properties are also inherited. During backcrossing the adventageous characters are successively lowered, but they still can be maintained on higher levels then those of the parents (for example protein content) and the unfavourable properties can be successively eliminated. The various morphological characters appearing during hybridization make it possible to draw conclusions as to the origin of corn. Our opinion is identical with that of Mangelsdorf (2. hybridization factor) supposing a cross of the ancestor of corn with teosinte.

STUDIES ON HETEROSIS PHENOMENA INDUCED BY TRANSPLANTATION IN LATER GENERATIONS OF TOMATO

G. PÁSZTOR

CHAIR OF BOTANY, HIGH SCHOOL OF PEDAGOGY, PÉCS

Heterosis-effect has been observed in the 1., 2., 3., 4. and 5. generations of vegetative hybrids of tomato produced by the author in 1953 by grafting the tomato variety *Solanum lycopersicum* var. *esculentum Mikádó* on *Solanum lycopersicum* var. *piriforme Sárga körtealakú*. The line N. 46. of the F_1 was characterized first of all by the absence of segregation and by the heterosis of the shoot system. In 1956 and 1957 the hybrid generations were exposed to extreme conditions in order to establish their resistance and productivity.

The results revealed a number of similarities between the heterosis of generative and vegetative hybrids. Some differences have also been observed. Thus the increase in yield due to heterosis and observed in F_1 was strongly augmented in F_2 and even more in F_3. The heterosis in yield was also preserved in the F_4 and F_5 generations. In this respect the vegetative hybrids are greatly superior to the generative ones. The heterosis effect of the vegetative hybrids, as far as the increase in morphological characters is concerned, did not extend to the whole plant as may generally be observed in case of generative hybrids. The plants of vegetative hybrid generations exhibited shorter stems irrespective of the variety used as a stock.

The results reported may be regarded as decisive as to the basic question whether or not the heterosis effect can also be evoked by vegetative hybridization in addition to the known method of generative crossing. If the heterosis effect may be regarded as a proof of successful hybridization in case of generative crossing, it can also be regarded as a proof of the hybrid nature of plant generations arising by transplantation.

ALLOMETRIC GROWTH OF FEATHERS IN CERTAIN HUNGARIAN RACES OF THE DOMESTIC FOWL

J. ERNHAFT

ZOOGENETIC RESEARCH GROUP OF THE HUNGARIAN ACADEMY OF SCIENCES, GÖDÖLLŐ

The object of the experiments was to find out whether — in the case of the "Transylvanian naked-neck" a correlation can be established between the dominant mutations and certain quantitative characters. It seems that a phenogenetic examination of this race affords information also in this respect. The present report contains an account of the results obtained from comparative investigations concerning correlations between the body weight and the heterosis of quill feathers in respect of the "Transylvanian naked-neck" and another Hungarian race of domestic fowl, namely the "Yellow Hungarian", as also in respect of their F_1 hybrids.

Results were evaluated with the method of observing allometric growth. The report discusses the applicability of this method in the analysis of quantitative characters. The use of this method enables us to separate different races in a precise manner as regards body weight and the growth of feathers; it facilitates, moreover, the description of sectional development, heterotic overgrowth and — by a comparison of the two races — a demonstration of the identity of the so-called ground scheme of allometric growth. The conclusion was reached that the naked neck as dominant mutation did not involve a general disturbance of feather growth.

The present investigation is but a first step towards a demonstration of correlations presumably existing between the dominant mutation and the concomitant changes in characters.

INHERITANCE OF NATURAL IMMUNITY IN GUINEA PIGS ACCLIMATED TO COLD

Gy. Szemere, Á. Bódi and L. Csík,

INSTITUTE OF MEDICAL BIOLOGY OF THE MEDICAL UNIVERSITY, SZEGED

An earlier communication of the authors demonstrates the fact that the factors of natural immunity undergo a change, the complement titre and bacterial power of the blood serum become higher, and the phagocytic activity of leukocytes grows stronger if guinea pigs are raised in the open air and so exposed to low temperatures from their youth. It was likewise shown that, with the exception of increased phagocytosis, all these changes were permanent, *i. e.* continued even after the animals had been transferred to normally heated pens. The present investigations had the object to find out whether increased natural immunity is transmitted to subsequent generations, and if so to what extent. For this purpose female guinea pigs acclimated to cold ("inured") were mated with likewise acclimated males, further acclimated females with normally-raised ("uninured") males and vice versa. Equally old offspring of uninured parents served as controls. Pregnant females were kept in warm pens, and the complement titre of the serum of the descendants, their bactericidal power and the phagocytic activity of their leukocytes were examined. Average results, based on the examination of 37 and 33 animals are summarized in the following table.

Titre of complement

Inured♀ — inured♂	Inured♀ — uninured♂	Uninured♀ — inured♂	Uninured♀ — uninured♂
131 U	124 U	119 U	108 U

Bactericidal power

Inured♀ — inured♂	Inured♀ — uninured♂	Uninured♀ — inured♂	Uninured♀ — uninured♂
+16,7%	+0,3%	−2,7%	−17,0%

It is evident that increase in the immune-biological values, elicited by acclimation to cold, is transmitted to the first hybrid generation even if the new generation is born in normally-heated pens.

SELF-REGULATION OF LIVING SYSTEMS AND THE LAWS OF INORGANIC EQUILIBRIA

L. Jendrassik

RESEARCH DEPARTMENT FOR PHYSIOLOGY AND PHYSIOLOGICAL CHEMISTRY, EÖTVÖS LORÁND UNIVERSITY, BUDAPEST

The living organism is an open system and flow-equilibrium, but with behaviour very similar to those of dynamic equilibria. One of the central problems of life is the question whether the autoregulation, as stated in the theses of Pflüger (1878) and Frédéricq (1885), is to be explained in physical and chemical terms. This was denied in principle by the "neo-vitalists" since the end of the last century. The regulatory function of the nervous system needs a special structure, which makes feedback possible, similarly to various technical instruments.

It is of fundamental importance that also (stable) physico-chemical equilibria, without any or with very simple structure, possess self-regulating abilities, expressed in Le Chatelier's law (1884) and similar to those of living organisms, noticed by Chwolson (1897). This law, since then acknowledged and used in physical chemistry, was misjudged

by a number of renowned physicists (EHRENFEST, PLANCK a. o.) and its validity doubted. Lecturer therefore endeavoured to clear the self-regulatory laws of physical and chemical equilibria. He shows that under the name of LE CHATELIER's principle there were, up to the present, two laws confused. The first is the "*law of direct resistance*". This states, that if an "intensive" parameter changes by an external force, this change acts against the continuation of this influence. The second is the proper principle of LE CHATELIER, the "*escape from the compulsion*", and is to be found in composite equilibria. This escape decreases the resisting power of the system, but it reduces and distributes the change caused by the external influence.

The simplest forms of self-regulation in living organisms are represented by these laws, and form the basis for both directions of the reactions (opposition and digression). In theory of LAMARCK only the inheritance of the acquired adaptations is problematic. These forms of reaction are evident phaenomena, which then appear even in inorganic systems.

THE STABILIZING FACTORS OF THE COLLAGEN FIBRE

ILONA B. BANGA

FIRST DEPARTMENT OF PATHOLOGICAL ANATOMY AND EXPERIMENTAL CANCER RESEARCH, MEDICAL UNIVERSITY, BUDAPEST

Collagen fibre or bundle is built up of fibrils arranged longitudinally and parallelly. Between them takes place the ground substance containing acid mucopolysaccharides. Hyaluronidase dissolves specifically the acid polysaccharides of the ground substance, as a result of which the permeability of connective tissue greatly increases. According to the earlier view the fibrils of the collagen fibre were kept together by the acid mucopolysaccharides ; the fibrils itself are only simple proteins composed of polypeptide chains. According to author's investigations the collagen fibre contains not only acid mucopolysaccharides, but also mucoids composed mainly of neutral polysaccharides which play a role in the stabilisation ot the fibre. Two mucoids could be isolated. One of them has been called $mucoid_1$. This is a component consisting mainly of dialysable oligosaccharide and is essential in the thermal and chemical contraction of collagen fibres. If it is dissolved the fibre loses contractility. Its deficiency leads to metacollagen formation. The other factor has been called $mucoid_2$. This is dissolved from the fibres by an enzyme, collagenmucoproteinase, isolated by the author from the pancreas and obtained in highly purified form. Chemical analysis showed $mucoid_2$ to be a heteropolysaccharide containing hexosamine, which stands near in its properties to keratosulfate, but contains also polysaccharides other than glucosamine and galactose. After the dissolution of $mucoid_2$, the fibre disintegrates in concentrated salt solutions and in dilute organic acids and no fibrogenesis can occur any more.

MORPHOLOGICAL STUDIES ON THE STABILIZING FACTOR OF THE COLLAGEN FIBRE

D. SZABÓ, J. BALÓ, ILONA B. BANGA and F. GUBA

FIRST DEPARTMENT OF PATHOLOGICAL ANATOMY AND EXPERIMENTAL CANCER RESEARCH, MEDICAL UNIVERSITY, BUDAPEST

The presence of stabilizing factors in the collagen fibre has been confirmed by polarization-, dark field- and electron microscopy. It has been shown that the dissolution of acid mucopolysaccharides by hyaluronidase does not lead to a disintegration of the collagen fibre. The staining, double refraction of the fibre do not change and it remains capable of contraction and relaxation. The dissolution of $mucoid_1$ leads to metacollagen, which shows no double refraction, but its fibrillar structure is still remained. However, the characteristic periodicity of 640 Å disappeares under the electron microscope. The staining, phenol reaction and enzymic dissolution of the fibre undergo a profound alteration. As a result of the dissolution of $mucoid_2$ the fibre disintegrates when treated with salt or dilute organic acid, but it still shows the periodicity of 640 Å by electron microscopy. Under the dark field microscope the

process of disintegration of the mucoid$_2$-free fibre can be easily followed and it can be demonstrated that the loss of mucoid results in a disintegration of fibrils and in a breaking of the fibre. The process is irreversible, *i. e.* no fibres can be formed of the fibrils after the mucoid$_2$-free fibre has been disintegrated. Thus, the presence of mucoid is essential in the fibrogenesis studied by NAGEOTTE and HUZELLA.

THE ROLE OF COENZYME IN THE STABILIZATION OF THE ENZYME MOLECULE

P. ELŐDI and G. SZABOLCSI

INSTITUTE OF BIOCHEMISTRY, HUNGARIAN ACADEMY OF SCIENCES, BUDAPEST

Most of the studies on the role of the coenzymes deal first of all with their function played in the enzyme reactions. The authors wish to elucidate some other properties of the coenzyme.

D-glyceraldehyde-3-phosphate dehydrogenase (PGAD) is known to combine firmly with 3 equivalents of diphosphopyridine nucleotide (DPN) coenzyme. It is also known that the PGAD isolated from mammalian skeletal muscle contains no disulfid bonds required for the stability of the protein molecule.

Authors showed that after the removal of the bound coenzyme the spatial structure of the protein molecule changed, as manifested in an increase in the optical rotation and the intrinsic viscosity, as well as in the digestibility by trypsin. The coenzyme can be rebound to the enzyme molecule and the original structure and activity are reversibly restored and thus the proteolytic digestibility decreases. This process is in correlation with the sulfhydril groups of the enzyme. Thus the coenzyme DPN plays a functional role and in addition takes part in the stabilization of the steric structure of the enzyme molecule.

If all of the sulfhydril groups of the PGAD molecule (14—SH/mole of protein) are blocked with p-chlormercuribenzoate, the specific optical rotation of the protein becomes substantially more negative and also the intrinsic viscosity increases. This means that about 35 to 40 per cent of the helix structure becomes unfolded.

Thus, the sulfhydril groups are capable of stabilizing part of the secondary structure of PGAD, by an as yet unknown mechanism. This fact lends support to an earlier view that the blocking of functional groups of enzymes acts not only directly on these groups. It has also the indirect action of changing the steric configuration of the enzyme molecule, inhibiting thereby sterically the development of an effective enzyme-coenzyme-substrate complex.

THE ROLE OF THE PARATHYROID GLAND IN PROTEIN METABOLISM

T. MONTSKÓ, A. TIGYI and K. LISSÁK

INSTITUTE OF BIOLOGY, MEDICAL UNIVERSITY, PÉCS

The known symptoms of parathyroidectomy are restricted to the neuromuscular apparatus and the changes observed can be traced back to a shift in ionic space. Authors demonstrated a new effect of the parathyroid, one upon protein metabolism. In thyroid-parathyroidectomized dogs the erythrocyte sedimentation rate showed extremely high values (100 to 110 mm in 1 hour). A similar phenomenon occurred also in the rat and as total parathyroidectomy can be performed in that animal, the experiments were continued on rats. Four days after parathyroidectomy total serum protein increased from 5.48 g per cent to 8.8 g per cent, albumin from 3.8 g per cent to 4.7 g per cent, globulin from 1.3 g per cent to 4.0 per cent and fibrinogen from 157 mg per cent to 270 mg per cent.

In response to 4 days of treatment with ethylenediamine-tetraacetate disodium to induce hypocalcemia, total serum protein increased to 7.5 g per cent, albumin to 5.6 g per cent, globulin to 1.5 g per cent and fibrinogen to 200 mg per cent, from the normal values presented above.

The results suggest that a correlation exists between normal parathyroid function and the protein balance of plasma, and that the above described effect of parathyroidectomy is realized not through a shift in ionic balance, but it is a direct specific effect of the parathyroid.

INVESTIGATIONS INTO THE MODIFICATORY EFFECT OF ISOLATED DESOXYRIBONUCLEIC ACID IN MAMMALS

A. TIGYI, I. BENEDECZKY and L. LISSÁK,

INSTITUTE OF BIOLOGY OF THE MEDICAL UNIVERSITY, PÉCS

The modificatory effect of DNA in mammals was investigated on the analogy of BENOIT's experiments. DNA was extracted from the testis and the liver with MIRSKY—POLLISTER's method, and its interaction with varieties, species, genera and orders observed. DNA obtained from wild individuals of *Epymis norvegicus* was injected into young individuals of *Epymis norvegicus* var. *albino* during two months. The same experiment was performed between the *Chinchilla* and the *Vienna white* species, between the genera *Fpymis norvegicus wild* and *Mus musculus* var. *albino*; moreover DNA extracted from calf thymus was administered to the same albinos. A high rate of mortality (30 to 70 per cent), retarded growth and development, and disturbed skin and hair formation was observed in all experimental series. These changes appeared to a considerably lesser extent (5 to 10 per cent) in the F_1 generation and disappeared altogether after sexual maturity had been attained. Contrary to BENOIT's results, no development of new — hereditarily modified — properties was observed.

PURIFICATION OF A RIBONUCLEIC ACID INDUCING THE SYNTHESIS OF PENICILLINASE

V. CSÁNYI and M. KRÁMER

INSTITUTE OF MEDICAL CHEMISTRY, MEDICAL UNIVERSITY, BUDAPEST

It has been previously established that the penicillinase production of *B. cereus* cells may be very much increased if these cells are treated with an extract which has been prepared from another strain of *B. cereus*, *i. e.* a strain which contains penicillinase as a constitutive enzyme. The active extract is prepared by extraction with 1 M NaCl, it may be boiled without loss of activity.

The present experiments were devised to show that the active factor is RNA. Nucleic acid was prepared from stationary phase *B. cereus* by two different methods: according to the phenol method of KIRBY and according to a modified chloroform method of HOTCHKISS. These preparations were able to replace the active extract eliciting penicillinase production. DNA-ase treatment of the preparations had no effect while RN-ase treatment completely abolished their activity. The nucleic acid preparation was active at a high dilution, near maximal penicillinase production was obtained when 2—5 μ M/liter nucleic acid (in adenine equivalent) was added to a cell suspension containig 1 mg dry weight per ml.

These experiments have proved that a specific RNA is able to transfer the property of penicillinase production from one strain to another (if the latter is genetically determined as an inducible one).

NEW DATA ON THE MECHANISM OF STREPTOMYCINE EFFECT

P. ZABOS

INSTITUTE OF MEDICAL CHEMISTRY, MEDICAL UNIVERSITY, BUDAPEST

Abstract not received.

THE ROLE OF TOXINS IN THE UNCOUPLING OF OXIDATIVE PHOSPHORYLATION FROM RESPIRATION

B. I. Pozsár

INSTITUTE FOR AGRICULTURAL EXPERIMENTS, IREGSZEMCSE

Previous experiments indicated that in susceptible wheat leaves *(Tricticum aestivum*, R 23) the infection by stem rust *(Puccinia graminis* var. *tritici*, R 21) inhibits oxidative phosphorylation, the most economic pathway of ATP synthesis. The parasitically increased respiration is due to the stimulation of glycolysis and to an enhanced operation of the pentose cycle. At the same time oxidative phosphorylation are uncoupled from cellular respiration. Since the level of high-energy phosphate bonds decreases also in the uninvaded parts of the infected wheat leaves, the translocation from the diseased tissues of a principle inhibiting oxidative phosphorylation (toxin-effect) can be postulated. The phospholipid metabolism of healthy and infected wheat leaves was studied in order to shed some light on the chemical nature of the toxin uncoupling oxidative phosphorylation. Studies on the incorporation of P^{32} into healthy wheat leaves indicated that the synthesis of phospholipids is the most intense in the growing leaf tissues. After 60—66 hrs the breakdown of labelled phospholipid molecules can already be detected. On the first day the extent of breakdown is 3 %. Later it may reach higher values (5—8 %). On the basis of isotope studies and on that of a 7—10 % decrease in phospholipids in older leaves, the turnover of phospholipid molecules could be calculated. A complete (statistical) exchange of phospholipid molecules in healthy wheat leaves takes place in 15—18 days. In the infected parts of diseased wheat leaves the amount of phospholipids decreases by 28 %. 85 % of the degraded molecules is lecithin. This points to a rapid breakdown of lecithin due to infection, probably associated with the accumulation of lysolecithin, the intermediary product of lecithin breakdown. The lysolecithin may exert a toxic effect on cellular metabolism by uncoupling oxidative phosphorylation from respiration.

COMPARATIVE STUDIES ON THE ORGANIC, ACID-SOLUBLE PHOSPHATE CONTENT OF NEONATAL ERYTHROCYTES IN VARIOUS MAMMALIAN AND DOMESTIC BIRD SPECIES

F. Kutas and Mária Stützel

INSTITUTE OF PHYSIOLOGY, VETERINARY COLLEGE, BUDAPEST

The organic acid-soluble phosphate (OAS-P) concentration of red blood cells in adult individuals of various species is rather well-known. However, scanty evidence is available as to fetal and neonatal values. The data concern 2 or 3 species only and indicate that neonatal red cells are high in OAS-P. As we wrote it in a previous report, this view cannot be generalized at all. We found the red cells of newborn dogs and rabbits to be very low in OAS-P. To elucidate the problem, we have studied the OAS-P content of red cells from newborn and adult individuals belonging to 10 different domestic and laboratory mammalian species. It has been found that whenever the OAS-P level showed a difference between newborn and adult, it was always due to differences in the quantity of one component, diphosphoglycerate (DPG). The changes in OAS-P were always parallel with those in DPG. The decisive importance of DPG is indicated also by the fact the red cells from day-old and adult domestic birds that contain no DPG showed the same OAS-P level. The same results were obtained for the red cells from young and adult *Rana esculenta* frogs that likewise contain no DPG.

Our results indicate that while in adult age the red cells of different species vary greatly in DPG content even within the same ordo *(e. g.* Ungulata) the similar components of neonatal red cells are almost at the same level. Thus, species differences are very slight in the initial phase of ontogenesis. Our results are of use in the interpretation of that evolutive process that leads to the present OAS-P concentration of red cells in the course of phylogenesis.

MORPHOLOGY OF SALMONELLA TYPHI-SUIS VAR. VOLDAGSEN PASSED THROUGH GELS OF HIGH DENSITY

B. Lovas

RESEARCH INSTITUTE FOR TECHNICAL PHYSICS OF THE HUNGARIAN ACADEMY OF SCIENCES, DEPARTMENT FOR MICROMORPHOLOGY, BUDAPEST

Studies on the morphology of bacteria passed through various gels of high density necessitated the elaboration of a suitable preparative technique. The experiments were carried out, instead of the usual U tubes, in Petri dishes. The Petri dishes are sterilized together with a small filter paper disk. The liquid culture of the bacteria will be placed on the filter paper and culture media of various agar concentrations, cooled to 50 °C, are then layered upon the wet disk. The bacteria, migrating to the surface of the layers were prepared by the "strip-off" and "impression" techniques since by this means good topographic results are also obtained. Depending on the concentration of the gel and of the thickness of the layer, the bacteria undergo serious biological changes. In case of thin layers the bacterial cells elongate and become wider, their content exhibits a course granular structure, the number of flagella, usually regarded as characteristic of the species, is often considerably multiplied. The hyper-synthesis of the flagella reveals itself both qualitatively and quantitatively. Very often a bundle of flagella consisting of 40—50 filaments and exceeding 4—5 times the original length of flagella. The bacteria partly loose their ability for cell division in the inside of the gel, without the concomitant loss of their ability of growth; they thus form giant cells and long forms. These bacterial cells may later undergo a granular degeneration and in that case is impossible to discover even traces of the cell wall on the micrographs. It might be supposed that these changes are products of anaerobic cultivation. On the basis of further observations we presume that the stimulus of the exaggerated production of flagella might be the inhibition of movement. Experiments are continued and extended to the investigation of chemical and serological problems.

HISTOPHYSIOLOGICAL DIURNAL RHYTHM STUDIES ON THE SUPRAOPTIC AND PARAVENTRICULAR NUCLEI OF ALBINO MICE

Magdolna M. Odorfer

INSTITUTE OF GENERAL ZOOLOGY AND COMPARATIVE ANATOMY, EÖTVÖS LORÁND UNIVERSITY, BUDAPEST

In male albino mice maintained at constant temperature and under standardized conditions of illumination the neurosecretory cells composing the supraoptic nucleus (in the following s. o. n.) and paraventricular nucleus (in the following p. v. n.) show well-defined diurnal, rhythmic changes in structure. The changes take place parallelly in the two nuclei.

The s. o. n. and p. v. n. from animals killed at noon contain most of the material staining with chromehematoxylin, that is accumulated at the periphery of the cell. This is separated by a chromophobic zone from the field next to the nucleus, that stains with phloxin and contains dust-like granulation. In the cellular processes transport of finely distributed neuro-secretory material is visible.

In the animals killed between 17 and 18 hours two kinds of cell can be found. One kind is similar to the cells described above, but these cells are much smaller in size and less granulated; the other kind is characterized by foamy cytoplasm, in which the paranuclear field is not separated from the chromophobic zone.

In the animals killed at midnight the s. o. n. and p. v. n. contain characteristic big cells of indistinct outlines, the cytoplasm is foamy and contains many vacuoles of varying size. The nucleus is big, the nuclear membrane is thin and the big nucleolus often leans the nuclear membrane.

In the animals killed in the morning poorly delineated big cells are found, but the phloxinophilic paranuclear field reappears and granules staining with chromehematoxylin are visible between the vacuoles.

From these histological changes author concludes that in the neurosecretory cells under discussion neurosecretory material is mobilized in the noon hours and is synthesized at night. The diurnal rhythmic structural changes at first described as occurring in the s. o. n. and p. v. n. of the albino mouse seem to reflect diurnal cycles in the function of these cells. Author attributes great significance to this in the rhythmic activity of the hypothalamic-pituitary system and of the organs controlled by it.

DIURNAL VARIATION IN THE VOLUME AND COMPOSITION OF THE URINE OF ALBINO RAT

M. Kurcz, I. Kecskeméti and Gizella Sósky

INSTITUTE OF GENERAL ZOOLOGY AND COMPARATIVE ANATOMY, EÖTVÖS LORÁND UNIVERSITY, BUDAPEST

By the administration of an automatic instrument constructed for this purpose it was possible to gather hourly the spontaneously discharged urine of smaller mammalia.

The investigations were made on albino rats kept under laboratory conditions. They have been fed at 9 o'clock a. m. Though the volume and composition of the urine showed a daily fluctuation as well, nevertheless a regularly recurring rhythm of 24 hours could be observed in the volume of urine and in the quantitative fluctuation of its constituents. In addition we may lay down as a fact that the rhythm of urine production and that of the quantitative fluctuation of the constituents are in correlation. On the basis of the results of our experiments it seems namely, that the relationship is especially close between the rhythmic changes in the volume of urine and the quantity of electrolytes dissolved in it. On the other hand, this correlation is less intimate in the case of non-electrolytes (*i. e.* total N, creatinine). The concentration of the discharged matters (Na, K, PO_4, Cl, etc.) tends to grow slowly and gradually and reaches its maximum at the time of the least urine production. By the way it is to be mentioned that the curve of the absolute quantity of substances discharged by the urine runs parallel with the rhythmic volume fluctuation curve of the urine.

From the investigations it was evident too, that the extent of urine production was the largest between 4—7 o'clock p. m., and the smallest between 3—5 o'clock a. m. Having continued the experiments in the autumn (October—November), we could establish that the daily rhythm of urine production may be changed seasonally, inasmuch as the rhythm of 24 hours — maintainig its earlier characteristic features — was moved 1—2 hours forward. As a result of this the maximum of urine production was found between 2—5 o'clock p. m. while the minimum was observed between 2—4 o'clock a. m. This postponement was particularly striking in the day-time hours.

Relying upon these findings the conclusion can be drawn that, in the case of such experiments which are of a tendency to determinate the volume of urine, or to detect its ingredients both quantitatively and qualitatively, the influence of the diurnal variation, moreover the seasonal fluctuations must be by all means considered.

EXPERIMENTAL STUDIES ON THE INNERVATION OF THE INTESTINAL CANAL OF THE FROG

I. Horváth

INSTITUTE OF GENERAL ZOOLOGY AND BIOLOGY, UNIVERSITY OF SCIENCES, SZEGED

After cutting the nerve fibres of the vagosympathetic and of the splanchnic nerve separately or simultaneously, sectional differences were noted in the plexi and histological strata of the digestive apparatus, as well as in the position of degenerating nerve fibres. These differences may be outlined in brief as follows. After cutting the vagosympahetic trunks, degenerating fibres were detectable mainly in the myenteric plexi of the oesophagus, cardia and fundus ; there is also a slight degeneration in the rectum. Whereas following splanchnicotomy degenerating fibres were found only in the fundus and caudal to it in the intestines. In the latter case, as opposed to what was seen after cutting the vagosympathetic trunks, rather massive degeneration was visible not only in the myenteric plexus, but also in the nerve fibres

supplying the various histological strata. Otherwise, it is characteristic of the innervation of the frog intestine that in the network of the plexus submucosus Meissneri unipolar nerve cells are found only in the oesophagal area, as opposed to other areas containing no nerve cells. On the other hand, in the network of the plexus myentericus Auerbachi and more distant, outside that network, but in continuity with it masses of unipolar and bipolar nerve cells can be differentiated, alongside a few multipolar ones. After cutting the vagosympathetic, degenerating synapses were visible around the unipolar nerve cells, lying more distant from the nerve trunks. Characteristic end-clubs were visible in the duodenum and other intestines at the submucosal-circular muscle layer junction. These end formations are apparently the interoceptors of the above mentioned intestinal areas.

THE ROLE OF NERVOUS AND ENDOCRINE FACTORS IN THE REFLECTORY AUTOREGULATION OF BLOOD PRESSURE IN THE RAT

T. Gáti, F. Gelencsér, Mária Endres and G. Boldog

INSTITUTE OF PATHOLOGICAL PHYSIOLOGY, MEDICAL UNIVERSITY, BUDAPEST

Male albino rats of our own stock were used. With the rats under urethane the abdominal aorta was cannulated and blood pressure was recorded in the bloody way. By tilting the operating table the animals were brought to the vertical (upright) position, and the blood pressure reaction resulting from this was examined. Normal animals responded after 5 minutes in the vertical position by a decrease in blood pressure amounting to an average of 15 per cent and when brought back into the horizontal position blood pressure returned to the initial level within 10 minutes. Ligation of the bilateral common carotids had little influence on the above changes. In the vertical position the fall in blood pressure was comparable to that found in the controls, but after the horizontal position had been restored, blood pressure did not reach the initial level. Transection of the bilateral vagi and aortic nerve resulted in a significantly deeper fall in blood pressure and in a poor restitution after the animals were brought back to the horizontal position again. Bilateral adrenalectomy interfered with regulation to a smaller extent than that. When kept in the vertical position until death, the blood pressure of the controls dropped to 0 in an average of 90 minutes. Ligation of the bilateral common carotids under similar conditions reduced the average survival time to $^1/_3$ of the control values. The same was found after bilateral vagotomy and cutting the aortic nerve, as well as after bilateral adrenalectomy. Regulation was most seriously interfered with when the bilateral common carotids were ligated simultaneously with the transection of the bilateral vagi and aortic nerve. Thus, the above interventions impair the regulation of blood pressure homeostasis through impairing the pressor and depressor systems.

THE ROLE OF PRIMITIVE CONTRACTILE AND NERVOUS TISSUE IN HIGHER VERTEBRATES AFTER LESIONS OF THE UPPER NEURON SYSTEM

F. Katona

STATE INSTITUTE FOR NEUROSURGERY, BUDAPEST

The contractile tissue and intramural network of various organs represents a lower phylogenetic grade. Following our investigations it can be stated that quadrangular electrotonic impulses—applied directly to paralysed viscera—may restore the impaired motor function after serious lesions of the spinal cord or the vegetative nervous system. This might be due to the special properties and innervation of the smooth musculature.

Investigating the influence of quadrangular current to lower invertebrates *(Hidra, Actinia)* regular peristalsiform movements can be registrated. In *Lumbricus, Hirudo, Ascaris* the responses to stimulation are very like, and can be inhibited with end-plate inhibitors.

In vivo experiments and in vitro investigations on viscera of higher vertebrates present similar results. The differences in responses of normal and denervated visceral tissues have been recorded. Clinically the method was applied in form of direct intravesical or intraluminal electrotherapy and approved by good results in more than hundred cases of visceral (vesical, gastrointestinal) paralysises after lesions of the spinal cord.

THE ACTION OF DRUGS ON DIURNAL LIFE-RHYTHM

E. WALLNER, MÁRIA HÖNIG and MAGDA RADNÓT

FIRST DEPARTMENT OF OPHTALMOLOGY, MEDICAL UNIVERSITY, BUDAPEST

As it has been established also by our earlier experiments, the diurnal variation of the eosinophil cell count is due mainly to the effect of daylight. The impulse of light, transmitted by specific fibres from the retina to hypothalamic centers and intermediated from there to the hypophysis, induces a regular decrease in the number of the circulating eosinophils to about 60 per cent of their original level. The regularly returning effect of the light may be thus considered as a physiologic stress activating the neuroendocrine system day by day.

Further studies were carried out to observe the action of different drugs on the light-induced eosinopenia. The drugs administered acting on different sites of the nervous system were : Serpasil, Largactil, Hydergin, Regitin. It could be stated that all these drugs abolish the usual eosinopenic response to light in the major part of cases. These results are in keeping with experiments claiming an inhibitory effect of central nervous system depressants on the stress-induced adrenal ascorbic acid depletion.

The inhibition of the eosinopenic response was produced not only by central depressants but also by drugs of adrenergic blocking property (Regitin). Convincingly uniform results were obtained especially with Hydergin. These evidences would suggest that also peripheral components may interfere with the mechanism of the light-induced eosinopenia.

THE EFFECT OF OESTROGENS ON LIVER FUNCTION

JUDITH GERGELY and A. KULCSÁR

INSTITUTE OF PHARMACOLOGY AND FIRST DEPARTMENT OF MEDICINE,
MEDICAL UNIVERSITY OF DEBRECEN

From the beginning on, oestrogen research considered the liver to be the principal site of oestrogen inactivation. Authors investigated the behaviour of the lesioned liver in response to the administration of oestrogen in vivo.

Liver lesion was induced by the carbon tetrachloride method of KAUFMANN. The sexual cycle of the control rats was 173.28 hours ; this was reduced to 123.40 hours after liver lesion. Thus, liver lesion is followed by an increase in the endogenous oestrogen level.

The same doses of oestron (4, 8, and 12 U) induced much longer oestrus in the group of liver lesion than in the control group. Also spayed animals with liver lesion show a more marked response than the controls. However, spayed rats break down oestron more effectively even in the presence of liver lesion than do adult (sexually mature) ones. This indicates the noxious effect of endogenous oestrogen after liver lesion.

If the animals treated with higher doses of oestron are treated once again with smaller doses, the oestrus will last longer than with the first loading. This suggests that oestrogen causes further damage to the already affected liver, interfering at least with its activity to break down oestrogen. Castration, elimination of the endogenous oestrogen quasi protected, relieved the liver. In the affected liver oestrogen caused the functional lesion and produced a process bearing resemblance to what developed in SANDMEYER's experiments in response to partial pancreatectomy and feeding carbohydrate.

A comparison of these data with published clinical evidence suggests the practical conclusion that in the presence of liver lesion oestrogen therapy should be carried out with extreme caution or it may be even contraindicated.

EFFECT OF ULTRASOUND ON THE DIFFUSION OF THIOCYANATE IONS IN FROG MUSCLES

GY. TAMÁS and GYÖRGYI RONTÓ

INSTITUTE OF MEDICAL PHYSICS, MEDICAL UNIVERSITY, BUDAPEST

Authors investigated the spontaneous diffusion and diffusion influenced by ultrasound in extracellular spaces of frog sartorii and gastrocnemii soaked into RINGER-solution containing thiocyanate. In the course of these experiments the circulation and influence of the

nervous system have been put out of action in order to enable the measuring of the primary diffusion-accelerating effect of ultrasound.

The product of diffusion constant and diffusion resistance was estimated by the authors for the thiocyanate ions in the extracellular spaces of muscles. Based on control experiments the diffusion constant amounted to $3{,}6.10^{-4}$ cm²/min for both sartorii and gastrocnemii.

Both outward and inward diffusion seems to be accelerated by ultrasound. Diffusion constant tested by the authors was $14{,}4.10^{-4}$ cm²/min. It is very likely that the pressure changes in the sound field and the cavitation gave rise to an increase in the diffusion rate. (Temperature level was held constant by appropriate cooling-system.)

Results of a longer irradiation period *(i. e.* 15 minutes) strongly suggest that ultrasound increases the permeability of the cell-membrane for the thiocyanate ions. However, no deterioration of cell-wall could be established.

HISTOCHEMICAL DEMONSTRATION OF CHOLINESTERASE IN NERVE ENDINGS OF INSECT MUSCLES

J. Hámori

INSTITUTE OF ANATOMY, MEDICAL UNIVERSITY, PÉCS

After impregnating with gold or silver the limb muscles of *Dytiscus marginalis* (Coleoptera) the nerve bundles, their ramifications running to the coxa, trochanter, femur and tibia, as well as the preterminal and terminal fibres running perilemmally can be clearly visualized. The thick fibre emerging from the nerve bundles embrace the muscle fibre generally with a "U" or "S" shaped coil. From this thick fibre, which possesses neurilemmal elements, thin preterminal fibres arise and run along the muscle fibre, firmly attached to the surface of the muscle fibre at sites corresponding to the insertion of the telophragms. Very thin terminal fibres arising from the preterminal ones run transversally on the surface on the muscle fibre, remaining between the boundaries of a muscular segment. The ending of these terminal fibres could not be visualized. Strange vacuole-like structures are visible mostly in close contact with the preterminal fibre at the site where the preterminal fibre originates from the thicker convoluted fibre, but also along the course of the preterminal fibres. Fresh, as well as 10 per cent formalin fixed frozen sections of the same muscles were tested for cholinesterase by the method of Nachlas and Seligman, as well as Koelle and Friedenwald. Cholinesterase is present both in the nerve bundles, and in the neighborhood of terminal structures. The cholinesterase reaction is particularly strong in the convoluted fibres, where most of it is found outside the fibre proper, showing a clearly visibly palisade pattern. At the same time also the fibre shows slight cholinesterase activity. The preterminal fibres are weakly cholinesterase-positive. The marginal areas of the vacuoles distributed along preterminal fibres exhibit very high cholinesterase activity. These vacuoles of high cholinesterase activity being detectable in large number not only in the leg, but also in the wing muscles suggests, that they might have some important role in impulse transmission.

HISTOLOGICAL AND HISTOCHEMICAL STUDIES ON THE NERVOUS SYSTEM OF DUGESIA LUGUBRIS O. SCHM. (TURBELLARIA)

Lenke R. Gazsó, L. J. Török and G. Rappay

INSTITUTE OF HISTOLOGY AND EMBRYOLOGY, MEDICAL UNIVERSITY, BUDAPEST

and

INSTITUTE OF EXPERIMENTAL MEDICINE OF THE HUNGARIAN ACADEMY OF SCIENCES, BUDAPEST

We have no suitable methods, up to the present, for the specific detection of the nervous elements of the Turbellaria. Such methods would, however, be very needful not only for the structural investigation of the nervous system but for the study of the regeneration processes too, all the more, because the nervous system plays, according to recent investigations, a decisive role in the regeneration. The authors used, in their investigations concerning the structure of the central nervous system (head ganglion, nervous trunks, commissures and

lateral nerves) and the neuro-muscular junction, following methods: hematoxylin-eosin and several molybdate hematoxylin stainings, detection of alcaline phosphatase and of the cholinesterase. One can demonstrate with hematoxylin-eosin stainings in the central nervous system only the cell bodies of the nervous cells. The stainings with molybdate hematoxylin methods are suitable for the detection of the nerve fibres and the nerve endings forming the neuro-muscular junction. The nerve fibres give, in all regions of the central nervous system, a strong phosphatase reaction. The authors could not find any difference between the head ganglion and other parts of the central nervous system regarding the phosphatase activity. There is a strong phosphatase and cholinesterase reaction in the region of the neuro-muscular junction. These investigations affirm GELEI's data obtained with silver staining methods and, on the other hand, differ from YAMAMOTO's observations and theoretical conclusions regarding the difference between the head ganglion and the nerve trunks from the point of view of enzymatic activity and physiology.

CHANGES IN THE NEUROSECRETION OF THE NERVOUS SYSTEM OF EARTH WORM UNDER VARIOUS EXTERNAL CONDITIONS

B. AROS and B. VÍGH

INSTITUTE OF HISTOLOGY AND EMBRYOLOGY, MEDICAL UNIVERSITY, BUDAPEST

160 sexually mature *Lumbricus rubellus* were used in the experiments. The animals were kept under constant temperature and humidity in garden soil. Effects of darkness, sun light, and UV light were studied.

The earth worms were killed by decapitation, ether or chloroform narcosis or by putting them directly into the fixative. After paraffine embedding, the sections were stained by the GOMORI chromhaematoxyline-phloxine method.

In our experiments we have found neurosecretion to be present not only in the head ganglion but also in the hypopharyngeal ganglion as well as in the ganglia of the ventral chain.

No considerable morphological differences were found under the ganglion cells. Dissimilarities between them are probably due to the various functional states of one cell type during neurosecretion. The cells are not evenly dispersed in all the ganglia, but form little groups which are arranged symmetrically corresponding to the body halves. According to our observations, these cell groups must have various physiological functions.

Each cell group ("nucleus") reacts always uniformly to the effect of sun light or UV light. In the animals, treated with sun or UV light, the mediodorsal cell group of the cerebral ganglion shows considerable vacuolization. The secretion granules can be found mostly along the nerve fibres of the interstice. Simultaneously with the above phenomena, the earth worms change their colour to a deeper one. After exposure to light, putting the animals into darkness, the cell groups refill with secretion granules. No changes could be observed in the other cell groups. According to our opinion, it seems very probable that the cell groups, described above have a chromatophorotropic effect.

IN VITRO BEHAVIOUR OF THYMUS IRRADIATED WITH X-RAYS

IRÉN PÁLYI and ESZTER KAPA

INSTITUTE OF HISTOLOGY AND EMBRYOLOGY, MEDICAL UNIVERSITY, BUDAPEST

Guinea pigs were irradiated with doses of 100 to 1000 r of X-rays. The formation of corpuscles of HASSALL and their in vitro behaviour were studied among the post-radiation effects. The corpuscles of HASSALL, which appear in large numbers, are not considered to be degenerative structures. As proof, the in vitro experiments and the comparison with corpuscles of HASSALL from aged animals are offered. In vitro, the thymus shows intense epithelial proliferation after irradiation. A close correlation was found to exist between the epithelial proliferation and the gradual disappearance of the corpuscles of HASSALL from the mother piece. The corpuscles of HASSALL in the thymus of aged animals, believed to be degenerative structures show in vitro no ability to proliferate, unlike the irradiated thymus. The appearance of corpuscles of HASSALL after irradiation indicate an active functional state of the thymic epithelial reticulum.

THE STRUCTURE AND MICROSCOPICAL INNERVATION OF THE SUPRARENAL GLANDS IN REPTILES

ARANKA STAMMER

INSTITUTE OF GENERAL ZOOLOGY AND BIOLOGY, UNIVERSITY, SZEGED

The suprarenal glands of reptiles may be considered an important stage in the phylogenesis of the suprarenal glands, as a remarkable transition appears in the relation of the interrenal (cortex) and chromaffin (medulla) substance in the different species. It has been established that the chromaffin substance is placed unilaterally dorsal and somewhat medially in the suprarenal glands of the lizards *(Lacerta agilis* et *Lacerta taurica)*. The chromaffin substance deeply penetrates among the interrenal cell-trabeculi mostly along the blood-vessels in the grass-snake *(Tropidonotus natrix)*. The suprarenal glands of tortoises *(Emys orbicularis)* possess the same structure as the birds where the cell-fascicles of the two substances run very closely and irregularly one upon the other.

The nerves of the suprarenal glands originate from the plexus aorticus in lizards and grass-snakes while in the tortoises from the plexus suprarenalis connected with it. In the ganglia of the plexuses are found neurons of greatly differing size. In lizards and grass-snakes mainly the multipolar, while in tortoises the unipolar cells are predominant. The neurofibrillar structure characterizes the ganglion cells of large size. In these cells the neurofibrils form a dense plexus around the nucleus, then enter one or more processes, and on the periphery of the cells continue. Smaller and larger ganglia are found in the suprarenal substance of the tortoise. The processes of the cells as postganglional vegetative fibres form a rich plexus among the chromaffin cells. The nerve-connection of the interrenal cells is doubtful. The nerve-fibres in this substance seem to be transient. The endings among the chromaffin cells and the synapses on the ganglion-cells support the view that the neuron theory is valid also for the field of the vegetative nervous system.

NEW DATA ON THE FLUORESCENCE MICROSCOPIC APPEARANCE OF VAGINAL EPITHELIAL CELLS

T. DONÁTH, GY. ORBÁN and R. GIMES

INSTITUTE OF ANATOMY AND SECOND DEPARTMENT OF GYNAECOLOGY, MEDICAL UNIVERSITY, BUDAPEST

The cellular elements of vaginal discharge stained with Acridinorange have been investigated in wet chamber preparations (subvitally) by fluorescence microscopy, according to the various phases. The procedure is simple, rapid and reliable and facilitates easy differentiation of cells. The fluorescence colour differences shown by the various types of cells are ascribed to differences in nucleic acid content. The fluorescence intensity resulting from staining with Acridinorange is parallel with the basophilia of the cell structure.

The procedure gives at the same time differential stainig of the nuclei. Authors suggest that in colpocytologic evaluation not only the morphological changes of nucleus and cytoplasm, but also the cytochemical changes should be observed. The affinity of the bacilli of DÖDERLEIN to certain types of cell is believed to be significant. Basing on the grade of desoxyribonucleic acid polymerization, the procedure demonstrates the early and late phases of pyknosis, as well as the difference in fluorescence between necrotic and living leucocytes. In the fluorescence microscopic picture bacteria are easy to differentiate from trichomonas.

DIRECT OBSERVATION AND EXPERIMENTAL ANALYSIS OF NUCLEAR CHANGES IN CONJUGATION

J. KORMOS and KATALIN KORMOS

CYTOGENETIC LABORATORY, SZEGED

The authors succeeded in tracing nuclear changes from the beginning to the end of the conjugation of *Cyclophrya (C. magna and C. katharinae)*. Our present knowledge has been enriched in many respects by these observations, of which those concerning isolating plasma are especially noteworthy. Plasma, condensing after the second meiotic division (1) protects the micronuclei differentiating into sexual nuclei from becoming inactive; (2) creates appropriate conditions for a micronucleus to reach the site of copulation while supernumerary micronuclei are being gradually eliminated ; (3) ensures that pronuclei be produced closely to the surface of conjugation by division parallel to this surface. The movement of the isolating plasma containing the sexual nucleus is directed by the attractive action of the conjugation surface. A single coherent isolating plasma is formed even in the case of triple or quadruple conjugations ; copulations therefore must take place beside to a single surface only, while — elsewhere — nuclear changes occur without copulation. The most important elements of the isolating plasma are those fine granules which have the same shape, size and refringence as cortical granules (kinetosomes), being quasi their entoplasmic equivalents but possessing a high capacity for locomotion. As regards differentiation, regeneration and other manifestations, they may be regarded as the tactical elements of cellular life. Entoplasmic gradients — arising at the time of nuclear changes — and the cortical morphogenetic gradient which determines the site of cellular gemmation display no interaction. By way of experimental interference with double and triple conjugations it was possible to produce not only autogamy but to induce — and even without the formation of synkarya — the development of new macronuclei from pronuclei as well. The new macronucleus can be eliminated at any time during its development (6 to 8 days) because — though becoming more and more fragmented — the old macronucleus does not hcease to remain active until the growth of the new is completed. New micronuclei, on the oter hand, do no more develop from the old ones after the elimination of the pronuclei, since they lose their activity earlier than the old macronuclei.

POSTEMBRYONIC GROWTH OF SUPERNUMERARY LIMBS GRAFTED INTO CHICK EMBRYOS

K. STRAZNICZKY

INSTITUTE OF ANATOMY, MEDICAL UNIVERSITY, PÉCS

Into embryonated eggs from stock breeds of Hungarian Yellow and Hungarian Speckled anterior and posterior limb anlages were transplanted in homoplastic combination on the 3rd day of incubation. Six chicks with successful transplantation were hatched, 19 of the total of 76 operated embryos succumbed on the 7th to 20th day of incubation. The growth of limb anlages of these was studied. The transplanted limbs were innervated by the 2 or 3, dorsal segments. Pain and pressure sense were demonstrable, but there was no motion.

From the 10th day of embryonic life on the growth of the transplanted limb begins to lag behind that of the normal limb ; the lag progressively became larger in postnatal life. Muscles develop on the 6th or 7th day of incubation but degenerate on the 12th or 13th day and are finally replaced by fat tissue. Joint surfaces grew normally until the 10th day of embryonic life ; on the 14th day the joint space is filled with connective tissue and cartilagineous union begins at about 16th or 17th days. Total ankylosis occurs in postembryonic life only. The feathers of wing grafts grow at the same rate as those of the mobile limb and rate of growth remains the same in the graft and normal limb.

The results indicate, that limb anlages grafted into a heterotopic site of the chick embryo show already full autodifferentiative ability from the 3rd day on. Growth is normal during 10 days, when regressive changes begin. The initial development of the shape of joint surfaces, muscles and of the limb is controlled by autodifferentiation, but the maintenance of joints seems to depend on other factors, especially on adequate function.

STUDIES ON THE DISTRIBUTION OF N RETAINED DURING PREGNANCY IN THE RAT

L. PÉNZES

DEPARTMENT OF ANIMAL PHYSIOLOGY, RESEARCH INSTITUTE OF ANIMAL BREEDING, BUDAPEST

The distribution of N retained during pregnancy has been investigated in animals in the first and third reproductive cycles.

The organs and viscera tested were: the uterus with the *products of conception*, the mammary gland parenchyma, mammary gland buds (lactiferous buds), the liver, the gastrocnemius muscle, a specimen of abdominal skin, the small intestine, the femur, the heart, the spleen and the kidneys. Changes in hepatic total nitrogen, structural N, albuminoid N and non protein N were also studied.

It has been shown that $^2/_3$ of the nitrogen retained during pregnancy is built into reproductive organs and foetuses, as well as into the liver and small intestine. Marked percentage differences were noted only for the uterus, lactiferous gland buds, liver and muscle, the values for which were lower than those for the same organs of the non-pregnant control animals. The analyses showed the N retention — calculated exclusively as a measure of gravidity — to be 1,1861 g in young animals and 1,5800 g in old ones.

"Protein storage" originating from the localization of N in tissues during pregnancy results in an absolute measure only, through a marked hypertrophy of the organs examined.

The changes observed may be explained directly by an increase in the water content of the organs examined, and indirectly by a change in onkotic pressure resulting from the reduced synthesis of albumin by the liver, and by an increased output of adiuretin and electrocortin by the pituitary-adrenal system.

Demonstrations

BIOLOGICAL TITRATION OF THE THRESHOLD-VALUE OF THE SENSATION OF PAIN IN HOUSE MICE

S. Antalfi and T. Gaál

INSTITUTE OF MEDICAL BIOLOGY OF THE MEDICAL UNIVERSITY, SZEGED

Laboratory strains of albino and house mice were subjected to comparative biological tests. The sensation of pain was found to have a threshold value of 16,52 sec. in albinos which is in agreement with literary data. The pain threshold of house mice proved to be very high, 62,28 sec.

It was attempted to displace this high difference between the two threshold values both in a negative and a positive sense. The first step was to perform measurements with the advancing duration of captivity, as it was supposed that a longer imprisonment would compensate the neutral reactivity of freshly captured house mice. Results were, however, similar to the first standard values.

The second step was to stimulate the animals by natural means, and the pain threshold of house mice was found to have a sharply decreasing tendency: 11,7 sec., while — at the same time — the reactivity of the albinos rose to 27,60 sec.

Both categories of mice were treated with adrenalin, and it was found that the difference in threshold values did not diminish as much as in the case of natural stimuli. The paper offers explanations in respect of the observed phenomena.

DIFFERENTIATION OF ESCAPE REFLEX IN MICE BY MEANS OF A NEW EXPERIMENTAL INSTRUMENT

P. Müller and S. Antalfi

INSTITUTE OF MEDICAL BIOLOGY OF THE MEDICAL UNIVERSITY, SZEGED

A new device has been elaborated by the authors which enabled them to differentiate individual animals or groups of animals for the purpose of establishing standard values.

Individual properties and the actual condition of the test animals were found to exert a strong influence on experimental results. The new method made it possible to confine dispersion and errors within narrower limits.

The differentiated animals were measured, and the results of the measurements justified the new method.

The experiments in question enable us to form homogeneous groups within populations, with due regard to neural and endocrine reactivity.

A NEW METHOD OF EMBEDDING LIPID-CONTAINING TISSUES BY MEANS OF A CARBAMIDE-FORMALDEHYDE SYNTHETIC RESIN

E. VÁGÁS

PLASTICS WORKS OF KŐBÁNYA, BUDAPEST

The use of the home produced carbamide-formaldehyde synthetic resin (Microcoll B and variants) offers a new possibility for embedding and preparing lipid-containing tissues. The embedding does not require besides the fixative formol-solution and saturating synthetic resin any intermedium. The impregnation and hardening is to be effected at room-temperature without any heat-effect. The solidity of the imbued tissue, needed for its sectioning, can be reached by a catalyst. The sectioning of the embedded material is made by means of an ordinary microtome.

The process may be combined with the polyethylene-glycol-wax method.

A kiadásért felel az Akadémiai Kiadó igazgatója — Műszaki felelős: Farkas Sándor

A kézirat nyomdába érkezett: 1959. IX. 12. — Terjedelem: 4,50 (A/5) ív

9953/59 — Akadémiai Nyomda, Gerlóczy u. 2. — Felelős vezető: Bernát György

13,— Ft