

# Berichte und Bibliographie

## Zprávy a poznámky

### CONFERENCES ON BODY COMPOSITION IN NEW YORK AND LONDON IN 1963

The research in the complex field of body composition has spread in a large scale during past twenty years — mostly in United States, but also in Europe and other parts of the world. Anthropological access to the solution of body composition problems was complemented with some further aspects — predominantly physiological. This fact means that not only the collected data are described but also some mechanisms controlling and directing body composition begin to be elucidated.

The progress in body composition research was mainly supported by the progress in methodology — i. e. either development of known methodical accesses or using quite new principals. — Practical utilization was further encouragement for spreading of this problematics — especially in clinical medicine, in veterinary medicine etc.

In 1963 several conferences were devoted to the problems of body composition: the first which was most comprehensive was organised by the New York Academy of Sciences and was held in New York on January 28, 29, 30, 31, February 1, and 2, 1963. The conference was supported in part by grants from the National Institute of Health, The National Science Foundation and the U.S. Atomic Commission, and took place partly in the Building of the New York Academy of Sciences and partly in Henry Hudson Hotel in New York. — According to the problematics the lectures were divided in several sections. In the first section the roots and goals of the Symposium were defined and elucidated by J. Brožek. — The second section was devoted to methodology and was opened by the lecture on studies of gross body composition by direct anatomical dissection (G. C. Pitts), which were carried out on guinea-pigs. A study of R. H. Alsmayer et al. was conducted to determine the relationship between fat measured by ultrasonic and lean (linear depth measurements together with certain composition indices — weight of lean mass of the bodies, weight of fat and bone in cattle and swine). It was shown that correlations among ultrasonic and actual fat measurements ranged from 0.61 to 0.46. — J. R. Stouffer has used radiographic and ultrasonic techniques with satisfactory results in animal evaluation studies and showed that ultrasonic is a promising potential tool for use in body composition investigations. — The method of measurement of total body fat in man by the simultaneous absorption of two inert gases (cyclopropan and crypton) was used in the study of G. T. Lesser and G. Zak; the results using the average values obtained from uptake of the two gases for the same individual increased the accuracy of body fat determination and agreed well with results on body composition calculated from total body water. — A relationship between body composition (ascertained by means of body density and total body water measurements) and nitrogen balance was studied by L. H. Kyle, E. J. Werdein and J. J. Canary in obese patients. — F. D. Moore and Caryl M. Boyden presented a nomogram for the estimation of skeletal weight, which is based on the fact that the relative skeletal weight appears to vary inversely with the ratio of exchangeable potassium (measured with  $K^{42}$ ) and fat-free solids. — The pneumatic method for determination of body volume, its history and technique was critically evaluated in the lecture of T. P. K. Lynn. — The air displacement method of measuring body volume in babies was preliminarily communicated by F. Faulkner, who is involved in the study of human growth. For determination of body volume of infants also a method of helium displacement is particularly suitable; the description of the apparatus, the evaluation of the reproducibility of the results gained in the same infants on consecutive days was the topic of the report of S. J. Fo-

mon, R. L. Jensen and G. M. Owen. — For determining body density an apparatus for measurement body volume by water displacement was described in the lecture of S. M. Garn and P. Nolan, Jr. — R. H. Gnaedinger, E. P. Reinecke, A. M. Pearson, W. D. Van Huss, Janet A. Wessel and H. J. Montoye compared results acquired in the same objects with several methods — by determination of body density by air displacement, helium dilution and underwater weighing; correlation between the results determined by air displacement and by underwater weighing was only 0.36, the correlation between results determined by air displacement and helium dilution was not at all significant. — The estimation of surface area and volume by a photogrammetric technique was described by W. R. Pierson. — J. B. Brožek, F. Grande, J. T. Anderson and A. Keys made some revisions of some quantitative assumptions concerning densitometric analysis of body composition; from their analysis it appears that no universally valid formulas for densitometric estimation of the fat content can be offered till now. — R. J. Wedgwood has pointed to the inconstancy of lean body mass — according to the proportion of water, bone etc. during ontogenesis of man. — I. Miller and B. B. Weil have given an example which indicated that comparison of body compositions determined by direct analysis among groups of animals should be made by covariance analysis with the logarithms of the variables. Finally, last lecture in this session was devoted to statistical problems — statistics for functions of anthropometric and somatolytic variables (E. Churchill).

The estimation of body cell mass by assessing body potassium content is a qualitatively new principal in the measurements of body composition. During past several years this method has been very successfully developed and used in body composition measurements; for that reason the third section was solely reserved to potassium methods. First lecture was involved in problems of accurate measuring the potassium content of the human body (C. E. Miller, A. P. Remenčik); it was shown that the data on total body water and the data on exchangeable potassium indicate that whole-body counters underestimate the potassium content in large subjects. E. C. Anderson presented a three component model of body composition — adipose, muscle and muscle-free lean using potassium concentration and body water as parameters. — The results of body composition measurements by large volume liquid scintillation counting and conventional chemical analysis in calves and pigs were correlated by T. G. Martin, W. V. Kessler, E. G. Stant, Jr., J. E. Christian and F. N. Andrews; the authors concluded that much work needs to be done on counting techniques and prediction relationship to reach the desired degree of accuracy in determining live animal body composition by liquid scintillation counting. The same was concluded considering the relationship between potassium content and body composition in porks and lambs (A. H. Kirton, A. M. Pearson). Radiochemical procedures using radioisotopes for estimating body composition in animals (S. M. Hansard) and men (E. A. Boling) were presented in following predominantly methodical lectures. — Age and sex differences in trends of lean body mass development, calculated from potassium ( $K^{40}$ ) measurements by means of crystal scintillation counter were described by G. B. Forbes and J. B. Hursh. — J. Barter and G. B. Forbes correlated the results acquired by the potassium — 40 method with anthropometric measurements — weight, height, various circumference measures etc. — in normal healthy subjects. G. R. Meneely, R. M. Heysel, C. O. T. Ball, R. L. Weiland, A. R. Lorimer, C. Constatinides, Ethelwynne U. Meneely analysed the factors affecting body composition determined from potassium content by sodium iodide crystal gamma ray spectrometer; they showed also a decline of body potassium content after 60 year in normal men and women and a close relationship of total body potassium to basal heat production. — The decrease of body potassium content in patients with muscular dystrophy and myotonia atrophica were reported by W. H. Bland, B. Cassen and Marianne Lederer.

The fourth section concluded the lectures concerning the themes on animal biology. An introductory statement on im-

plications of research on body composition for animal biology was made by A. M. Pearson. R. W. Bray presented the results on biopsy and core techniques for estimating body composition at various stages of growth in pigs; L. E. Orne has suggested a combination of several linear measurements to identify the "meat-type" animal more precisely. The report of G. P. Lynch and G. H. Wellington described a method of measuring the specific gravity of a living hog by underwater weighing; the correlations and regression equation between the results of this method and results of chemical analysis (content of water, solvent extractable fat, nitrogen and ash) were also given. J. T. Reid, A. Bensadoun, O. L. Paladines and B. D. H. Van Niekerk examined the relation of body water, body composition and indirect calorimetry in ruminants. — Anesthetic inducer sleep time of the thiobarbiturates (Kemithal and Thiopental) is closely related to body composition — body fat and lean body mass content; sleep time could approximately predict the body fat content, but the reliability of this measure needs more experimentation (L. Feinstein, R. L. Hiner). — A. J. Wood and T. D. D. Groves showed the changes in body composition of the pig during early growth based on deuterium oxide dilution technique. — Further lectures were devoted predominantly to physiological problems — e. g. the effect of variable food intakes on growth and body composition in rats (W. B. Weil, Jr. and W. M. Wallace), the influence of ration on body composition of growing farm animals — calves, pigs etc. (T. G. Martin, V. A. Carwood, W. V. Kessler, J. E. Christian, F. N. Andrews), relationship of body composition, chemical maturation, homeostasis and diet in the new-born pigs (L. J. Filer, Jr., and Helen Churella), the effects of feeding frequency on body composition in normal, forced-feed and hypothalamic-hyperphagic rats (C. Cohn). Last report of this section concerned interesting problems of the influence of chronic acceleration upon growth and body composition in birds (A. H. Smith and C. F. Kelly).

Human biology and research in body composition was the main theme of the fifth section, which was opened by S. M. Garn. — F. Falkner answered in this report a very important question, whether a relatively simple anthropometric and radiographic measures can yield reliable information on body composition, in a negative sense; till now it is necessary to use special methods which were mentioned above. — There exist many close relationships among anthropometric indicators and body composition throughout the life which are expressed by high correlation coefficients (A. R. Behnke), but they could yield only approximative appraisal of body composition. — Marion M. Maresh investigated tissue changes in children during growth from X-rays of the extremities; the same method was used for subcutaneous fat determination in white and negro men and women (G. W. Comstock and Verna T. Livesay). — Results on subcutaneous fat (measured by caliper) of american white males were statistically analysed and the distributions of the skinfold values for five-year age groups were presented in the lecture of J. Brožek, J. K. Kihlberg, H. L. Taylor and Ancel Keys. Skinfold thickness in primitive people native to cold climates and their relation to rectal and average skin temperature was investigated by R. W. Elsner. The development of weight, height and skinfold thickness in Papuans was described by A. A. J. Jansen. The paper of E. E. Hunt and F. P. Heald has dealt with the timing of events in the adolescent cycle as related to leanness-fatness and muscularity in boys from 12 to 18 years (measuring total body water, stadtartized lateromedial radiograph). — L. P. Novak was interested in age and sex differences in body density and its relation to creatinine excretion of high-school children. Also G. T. Lesser, Indra Kumar and J. M. Steele investigated changes in body composition with age in adult subjects with simultaneous measurement of total body (HTO) and extracellular ( $S^{35}O_4$ ) water and cyclopropane absorption; the decrement of hydration of the fat-free body mass with age was ascertained. — Charlotte M. Young, Joan Blondin, Rosalinda Tensuan and J. H. Fryer have studied body composition in women thirty to seventy years of age (anthropometry, skinfold thickness by a caliper and X-rays, body water, basal oxygen consumption and

excretion of creatinine); the mean values for age categories and mutual relationship (correlation coefficients) of these indicators were given. — The women of the same age were investigated also by J. A. Wessel, A. Ufer, W. D. Van Huss and D. Cederquist; except of anthropometry and skinfold thickness also serum cholesterol, strength and flexibility were measured. — Trends in selected indices of body composition (anthropometry, body density, body water spaces, basal oxygen consumption, creatinine excretion, bone density coefficient) in men between the age 30 and 80 years were examined by A. H. Norris, T. Lundy and N. W. Shock.

International section in which the lectures of over-seas guests were presented was introduced by J. Brožek. — G. Harrington's paper has concerned technical errors, biological variation and some other statistical problems arising in body composition studies. — F. P. Muldowney presented a method based on muscle biopsy analysis for the definition of mechanisms underlying disturbances in serum sodium concentration in terms of alternation in total body water and the content of exchangeable sodium and potassium. — The changes in body composition during growth and senescence in men and women, the influence of diet and exercise and the relation of body composition to oxygen consumption during optimal and maximal work performance and some other functional indicators in various ages were investigated by Jana Pařízková. R. Passmore summarised briefly the difficulties in analysing the changes in body composition brought about short periods of calorie imbalance in obese persons.

Most interesting lectures were presented in seventh-physiological section, which was opened by L. H. Kyle. — F. C. Bartter investigated the control mechanism of extracellular fluid solute concentration, extracellular fluid volume, intracellular fluid solute concentration, intracellular fluid volume and also the disorders in the regulation of body water or solute concentration. L. S. Edelman studied the role of external transport mechanisms in the regulation of body potassium content. — Nonlinear relationship between total exchangeable potassium representing the actively metabolising cellular protein (or body cell mass) and energy expenditure was proved by J. M. Kinney, J. Lister and F. D. Moore. — R. A. Liebelt examined the role of genetic, hormonal and neurogenetic factors as they influence the deposition of lipid in the adipose tissue and the response of adipose tissue in experimental obesity. — Brief report of G. Steiner and G. F. Cahill attempted to define the factors controlling the lipid content of an animal adipose tissue from a physiological and biochemical approach. — The data of A. R. Remenchik and J. Bernsohn showed the relationship between the composition of fatty acids and the total fat content of the body. K. P. Chen, A. Damon, O. Elliot have made anthropometric and physiological measurements (e. g. anthropometry, body density, blood pressure, blood volume, vital capacity etc.) in Chinese on Taiwan; mean values and results of intercorrelation were given. — Study of E. Jokl has confirmed that intensive physical training produces within a few months major changes in body composition, consisting of a loss of excess fat and of a gain in lean body mass. — U. C. Luft, D. Cardus, T. P. K. Lim, E. C. Anderson and J. L. Howarth presented the evidence that the magnitude of maximal oxygen consumption relative to fat-free weight is associated with the potassium concentration of the latter. L. E. Smith and J. Royce investigated muscular strength in relation to body composition; from the correlation coefficients it is clear that the use of lean body weight, leg volume or "lean leg volume" as a criterium for comparing leg strength has no appreciable advantage over the use of body weight.

The last eighth section was devoted to clinical implications of research on body composition; introductory paper of F. D. Moore concerned the applications of body composition measurements in the daily care of the sick people. J. Seitchik, C. Arper and A. Szutka reported the results on changes in body composition during pregnancy, B. M. Kagan, Natalie Felix, C. W. Molander, R. J. Busser and D. Kalman the results on body water changes in relation to nutrition of premature infants. The changes in body composition of normal infants in relation



to diet were investigated by F. M. Hanna. — A controlled study on changes in body composition in malnourished infants who had no clinical evidence of oedema or hypoproteinemia during repletion was presented by L. Cokington, F. M. Hanna and R. L. Jackson. G. M. Owen, R. L. Jensen, Lora N. Thomas and S. J. Fomon have showed that variations in age is not an important determinant of total body water in the age of three to seven months; further they proved significantly higher percentage of water in boys in this age. — Cell growth and body composition was studied by D. B. Cheek. — The results of direct analysis of body composition in children of diabetic mothers in comparison with those of normal healthy mothers were presented by B. A. Fee and W. B. Weil, Jr. — H. B. Houser, D. R. Weir, A. S. Litell, R. M. Greenway and O. Lindan compared body composition of "well-nourished" and "poorly nourished" chronically ill persons. — R. F. Goldman, R. Bullen and C. Seltzer investigated the changes in specific gravity and body fat in overweight female adolescents as a result of weight reduction. Energy balance of obese patients during weight reduction and the influence of restriction in diet together with exercise was studied by E. R. Buskirk, R. H. Thompson, L. Lutwak and G. D. Whedon. — W. E. Abbott and Kai Albertsen investigated the effect of starvation, infection and injury on the metabolic processes and body composition; the authors have showed that e. g. the rate and magnitude of nitrogen catabolism is greater in males than in the females and greater in the well nourished than in the undernourished or in the obese subjects.

The effect of androgens on some aspects of body composition (i. e. red cell volume, total body water, total exchangeable potassium and oxygen consumption) and erythropoiesis in octogenarian men in comparison with young men was studied by N. G. Nathan, S. Piomelli, J. F. Cummings, F. H. Gardner and A. L. Limauro. — E. A. Boling reported the changes in body composition during illness and convalescence measuring exchangeable potassium and sodium. — P. R. Schloerb and J. J. Grantam measured total body water, chloride and plasma potassium and sodium. — P. R. Schloerb and J. J. Grantam measured total body water, chloride and plasma volumes together with exchangeable body sodium, potassium and chloride as well as plasma electrolytes, urea nitrogen and protein in experiments in dogs before and after loss of gastric juice for one week; correlations between changes of selected indicators mentioned above were given. — Direct muscle analyses have been performed in patients with hypokalemic familial periodic paralysis immediately before and during induced attacks of paralysis by P. J. Talso, M. F. Glynn, Y. T. Oester and J. Fudema; their data serve to indicate that in this form of paralysis water, potassium and sodium play some role in the genesis of the paralytic episodes. — Last lecture in this section on body composition before and after surgical correction of Cushing's syndrome was presented by L. H. Kyle, J. J. Canary, E. J. Werdein and D. Clive.

The whole symposium was finally closed by A. R. Behnke, who concluded on the basis of presented lectures that there exists a preponderance of methodology in comparison with original data; it seems that for the successful development of the research in the field of body composition it would be necessary not only to extend the collection of inevitable basic data in normal and also pathological subjects but first of all to deepen the study of all underlying physiological mechanisms together with metabolic processes which control all the changes of body composition in various physiological and pathological conditions.

The second conference which was involved in the problems of body composition in 1963 was the Symposium on "Body Composition: Implications for Human Biology" which was organised by the Society for the Study of Human Biology. It was held on August 2nd and 3rd 1963 at the Institute of Child Health in London. — There the reports reviewing summarily certain aspects of research in body composition were presented by invited lecturers who have been specialised in the problems in question. — After opening the morning session (chairmen: D. J. M. Tanner) by J. Brožek two special questions were reviewed: human

anatomy and indirect methods for the study of body composition (R. Passmore) and animal studies with consideration of implications for the study of human body composition (A. S. Jones).

Afternoon section of the first day was presided by J. Brožek and included lectures on following themes: chemical analysis of the body (E. M. Widdowson), potassium-40 determination (W. von Döbeln), radiographic studies of body composition in children and adults (J. M. Tanner), hydrometry of growth and ageing (B. Friis-Hansen) and body composition of normal adults (K. Oleson). The program of the second day was opened by J. V. G. A. Durnin who has spoken on somatic standards of reference. H. Ljunggren presented the results on sex differences and R. W. Parnell on human size, shape and composition. The chairman of this session was professor N. A. Barnicot. — Afternoon session on the 3rd of August was presided by professor R. Passmore; the lectures of J. F. Brock and J. D. L. Hansen concluded the results on body composition and nutrition in normal and malnourished infants and adults. — Jana Pařízková's lecture concerned the problems of body composition and the influence of physical culture and sport in various stages of adaptation for intensive muscular work. — Last lecture was devoted to body composition and its relationship to the aetiology of degenerative diseases (P. Bjerrulf).

Further Symposium which took place in London on 7 August 1963 was held by CIBA Foundation in honour of Professor J. F. Brock on the theme „Diet and bodily Constitution“. There the lectures concerned predominantly the problems of disturbances of growth and bodily development at the influence of malnutrition, endocrine disturbances, stress or some pathologic conditions in the early or later stages of development.

Jana Pařízková

#### ÖSTERREICHISCHE ANTHROPOLOGISCHE FORSCHUNGEN IN NUBIEN

Die Expedition des Wiener Naturwissenschaftlichen Museums, die unter der Leitung von Doz. Dr. K. Kromer seit dem Jahre 1961 alljährlich archäologische Forschungen im Kataster der Gemeinde Sajala in Ägyptisch-Nubien (130 km südlich von Assuan) durchführt, hat auch das systematische Studium des geborgenen anthropologischen Materials in ihr Arbeitsprogramm aufgenommen. Ebenso wie in der polnischen oder tschechoslowakischen Expedition, die sich an der von der UNESCO organisierten internationalen Aktion zur Rettung der nubischen Kulturdenkmäler beteiligen, Anthropologen mit Ägyptologen, Archäologen und Architekten zusammenarbeiten, beteiligt sich an den österreichischen Terrainforschungen der Anthropologe Doz. Dr. W. Ehgartner. In den beiden Wintersaisonen 1961/62 und 1962/63 wurden 240 Gräber freigelegt, aus denen man mehr als 200 komplette Skelette bergen konnte. Das gereinigte, restaurierte und in Polyäthylen-Säckchen verpackte Material wurde nach längeren Verhandlungen von den ägyptischen Stellen zum Transport nach Wien freigegeben. In der anthropologischen Abteilung des Wiener naturwissenschaftlichen Museums wird es eingehend studiert und ich konnte es dort anlässlich meines Besuches im September 1963 besichtigen. Das Material ist sehr gut erhalten und hat dank der ihm gewidmeten Sorgfalt auf dem langen Transportweg keinen Schaden genommen. Es stellt einen nennenswerten Zuwachs zu den 765 altägyptischen Skeletten dar, die aus früheren Forschungen des Wiener Ägyptologen H. Junker in Toschka, Ermenna und El-Kubania in Nubien und in der Umgebung der Pyramiden von Gisa bei Kairo stammen. Die österreichischen Traditionen der anthropologischen Erforschung des alten Ägypten (C. Tooldt 1919, G. Gruber-Menninger 1926) fanden so eine würdige Fortsetzung. In der vergangenen Saison 1963/64 war die Erforschung eines weiteren spätrömischen bis christlichen Gräberfelds in Sajala geplant, an der sich Doz. Ehgartner aus gesundheitlichen Gründen nicht beteiligen konnte.

Über das anthropologische Material aus der ersten Forschungskampagne in Sajala hat Doz. Ehgartner bereits vorläufige Referate abgestattet (Die menschlichen Skelette aus