Further Section

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Book Reviews

Kjessler, B.: *Review of Karyotype, Meiosis and Spermatogenesis in a Sample of Men Attending an Infertility Clinic. Monographs in Human Genetics, Vol. 2*. S. Karger, Basel/New York 1966, VIII + 92 p., 19 fig., 15 tab., sFr. 23.50.-.

The author has addressed himself to a vital problem in human infertility and has produced some very important information. While this should be viewed with the fact clearly in mind that the subjects are mates of females of unknown reproductive capacity, much of importance to future work nevertheless has been uncovered. As the illustrative material clearly demonstrates, considerable care has been taken with testicular squash preparations, testicular histology and techniques of assessing sperm count, though somewhat less has been taken with the assessment of mitotic complements.

Of particular interest in the meiotic work are several findings based on 30 testicular biopsies (692 cells) from 135 subjects. The incidence of the X and Y existing as univalents at diakinesis-metaphase I was 4.4%, a figure of significance when evaluating it from a squash technique. The estimates of chiasma frequency range from 47.0 to 54.9, compared with previous figures of 50 to 63 from Ford and Hamerton, who studied a somewhat older, though smaller, population. The finding of a lowered mean frequency of chiasmata in the male who was a D/D translocation heterozygote has many important theoretical implications for assessing classical notions of chiasmata formation. The fact that the highest number of abnormal sperm in seminal examinations was also associated with this D/D abnormality is very relevant to the question, as noted by the author in another section, of whether or not an unbalanced haploid complement affects the progress of meiosis up to and through spermiogenesis.

It is of great theoretical and clinical interest to examine the author's tables of sperm counts, testicular histology and number of cells obtained for meiotic analysis. In these data the decision of when a testis biopsy will be cytogenetically informative as predicted by accurate sperm counts is demonstrated to be a difficult one. In Table B I it is noted that 13 to 27 analysable meiotic figures were obtained from patients with counts of o to 5 million. Some cases of severe germinal failure and azospermia yielded no meiotic figures, yet case No. 42, with a sperm count of < 1 and a histologic diagnosis of spermatocyte arrest, yielded 20 figures. A similar histologic defect in case No. 112, with a sperm count of 11 million, or case No. 124, with a count of < 1, yielded no success in squash preparations. It would thus seem prudent to attempt a testicular biopsy in an unfertile man regardless of seminal analysis or estimated testicular size, recognising that a histologic diagnosis can probably be made and, perhaps, a cytogenetic one. Some data in this study on pachytene pairing, anaphase I and II configurations and second meiotic metaphase might have indicated a greater likelihood of success for the latter.

The author, in a well-illustrated yet brief (92-page) monograph, has presented a fine argument for much more work using these techniques. It is hoped that his concluding remarks are not taken literally but that the several fruitful directions suggested by the data overrule any reluctance to pursue fully any meiotic studies in the male with proven infertility.

Georgiana Jagiello, London

Homburger, F. (editor): *Progress in Experimental Tumor Research, Vol. 8*. S. Karger, Basel/New York 1966, 297 p., 157 s. 6 d.

The term 'tumor research' has always encompassed a diversity of subject matter, and this volume is no exception. The seven papers presented can be divided into three groups: the biology of tumors; tumor virology; and, lastly, pharmacology and radiotherapy.

P. M. Gullino describes his work on the internal milieu of tumors, showing that it is possible to obtain accurate measurements of the immediate environment of the neoplastic cell. The second paper, by J. M. Vasiliev and V. I. Guelstein, considers local cellular interactions in tumors and is again concerned with the environment of the tumor cell, with extensive discussions on stroma formation, factors influencing the growth of implanted tumor cells and local cell interaction in the foci of chemically induced tumors.

The melanotic tumor of *Drosophila* has been a controversial subject for many years, and A. Rottino and M. J. Kopac present evidence that this lesion is granulomatous and not neoplastic. Two papers on tumor virology follow, both concerned with studies on the polyoma group of viruses. J. D. Almeida, A. P. Waterson and E. W. L. Fletcher deal with morphological studies on human wart virus, concluding that the virus particle possesses 42 capsomeres. V. Defendi, in an excellent and comprehensive review, discusses the transformation *in vitro* of mammalian cells by polyoma and simian 40 viruses, with detailed descriptions of the test-cell systems, the general process of transformation, including morphological, neoplastic and antigenic changes, and the fate of the virus in the transformed culture.

H. Savel then presents a review of the metaphase-arresting plant alkaloids, covering the pharmacology, metabolism and clinical use of colchicine, podo-phyllotoxin, vinblastine and vincristine. The last paper in the volume, by A. Engeset, is a summary of original work by the author on local irradiation of lymph nodes in the rat, an important finding being that radiation damage to lymphatics and lymph nodes impairs the barrier

functions of these structures. Following this observation, the logical conclusion is drawn that therapeutic irradiation of lymph nodes will only be effective in destroying already existing metastases therein.

T. H. Pennington, London

Kallos, P. and Waksman, B. H. (editors): *Progress in Allergy, I* V. *10*. S. Karger, Basel/New York 1966, XII + 292 p., sFr. 60.-.

This, the tenth volume of the series *Progress in Allergy,* contains a short but interesting introduction by B. H. Waksman and five articles on immunological subjects. The review by Makinodan and Albright, 'Proliferative and Differen-tiative Manifestations of Cellular Immune Potential', and that by Uhr and Finkelstein, 'The Kinetics of Antibody Formation', fully succeed in describing the current concepts concerning the complex processes of immune response. The articles arc both comprehensive and critical in illustrating the sequence of events underlying the initiation of antibody synthesis, the nature and number of cells involved in immune response and the dynamics of the formation of yM

and yG-globulins. Recent investigations on the production of immunoglobulins in single cells or clones, which have proved to be extremely valuable in understanding the genetic mechanism involved in the synthesis of these proteins, are critically examined. The book can be confidently recommended to all those interested in cell biology and genetics, though the other three reviews deal with subjects which are not closely related to genetics.

M. Adinolfi, London

P. Eberle: *Die Chromosomenstruktur des Menschen in Mitosis und Meiosis*. Gustav Fischer, Stuttgart 1966, XXI + 261 p., 113 fig., DM 58.-.

During the past few years there has been a great increase in the number of investigators actively engaged in the study of human chromosomes, especially of congenital abnormalities and various pathological conditions. The medical profession, realising the diagnostic value of chromosome studies, has taken an ever increasing interest in this field. The monograph under review is aimed at the clinician. Up-to-date information on human chromosome studies is presented, together with the fundamental cytogenetical knowledge that is necessary to understand and interpret the significance of chromosome behaviour. The author is well equipped for this task; he is known for his studies on plants and animals and has recently made a reputation by his investigation of meiosis in man. This monograph contains many original observations hitherto unpublished.

The first part is descriptive, giving detailed information on techniques and material suitable for chromosome studies. Extensive quantitative data are presented in numerous tables concerning chromosome length and arm ratios. The author describes his investigation of the spatial arrangements of chromosomes in relation to the nucleolus and the association of certain chromosomes at metaphase. More than a third of the monograph is devoted to the description of human chromosomes during meiosis. The author comes to the conclusion that the duration of mitosis is 10 to 24 h, while meiosis can take anything up to 30 days, the pachytene stage lasting 8 days. About 50 photographs illustrate the various stages of meiosis, and on these are based the various karyotypes of pachytene and diplotene chromosomes. Chiasma frequencies arc estimated in diplotene chromosomes, and some interesting configurations arc illustrated with photographs. One shows a bivalent with eight chiasmata, which is the highest number so far observed. The author reports the average chiasma frequency to be 55.7 per cell in diplotene and 44.7 per cell in diakinesis. These are only a few selected samples to indicate the detailed information that the reader will find in this book.

Besides the human chromosomes, in the second part of this monograph the author deals with many problems of cytogenetics on a comparative basis. Reference is made to other organisms than man to discuss structural and numerical changes and their genetical repercussions. He presents a stimulating speculation about evolution of man's karyotype, the gene content of the human genome, sex-determination, Lyon's hypothesis, the development of Barr bodies and the relationship between chromosome structure and intra- and extracellular gene function, just to mention a few. This monograph contains a great wealth of information; it presents valuable original observations which will be useful to all who are interested in or studying the human chromosomes. Each chapter has its own

extensive bibliography. However, much repetition of references could have been avoided if they had been put together at the end of the volume. The large number of tables and illustrations make the book useful to English readers. There are, however, two serious criticisms: the inferior reproduction of many of the very interesting photographs and the high price of the monograph, though it is only a paperback.

P. C. Roller, London

C. D. Darlington and K. B. Lewis (editors): *Chromosomes Today, Vol. 1*. (Supplement to Heredity *19,* 1964.) Oliver and Boyd, Edinburgh/London 1966, XII + 274 p., 63 s.

The international conference on which this book reports (the First Oxford Chromosome Conference, July 28-31, 1964) had the stated aim of discussing fundamental problems of chromosomes among workers whose positions are scattered because of their diversified research materials and interests. One hundred investigators responded to this call. Examining the 31 papers, their abstracts and the abstracts of the 19 demonstrations presented, one gains the impression that diversity is indeed the main feature of their contents as far as subject matter, newness of data and comprehensiveness of coverage are concerned. Lacking a central theme, the book becomes a collection of varied and uneven articles, with little

or no unity. Scientific discussions, either on specific topics or on matters of common interest, arc not recorded in the volume. This is regrettable because the exchange of ideas among investigators of such broad representation would also be valuable to readers not participating at the meeting. The conference succeeded in illustrating the richness of fields of inquiry in present-day chromosome research and, among other things, in establishing an additional basis for future contacts. The book itself is of merit solely on the basis of individual contributions. The volume is not a general reference.

An introduction is given by Darlington in his presidential opening address, in which he details his views of chromosomes as "the focus on which the physical sciences are now able to converge and from which the biological sciences always must diverge. "He sees the chromosomes as occupying the central position in the "molecule-gene-chromosome-organism-community" sequence, concluding that "everything new in life begins in the cell, and very nearly everything in the chromosome itself."

The formal papers are distributed about equally in number into three sections: plants, nuclear structure and animals. In the first section four papers are concerned with the accessory chromosomes in higher plants and cover the previously well-studied aspects of cytological behavior and adaptive significance in these materials. In a paper that appears later in the volume Darlington and Haque observe the late DNA replication in the B chromosomes of rye. Brat observes differences in the frequency and localization of chiasmata between male and female meiotic cells of *Allium;* these differences are taken as evidence for recombination control in this genus. Riley, in a separate paper, reports that temperature affects the chiasma frequency only in certain chromosome variants of *Triticum aestivum* and not in the euploid, indicating genotypic control of chromosome pairing. The intriguing but often neglected problems of chromosome repulsion and non-

homologous association have been reviewed and some original experimental data presented in an article by Pusa. Gerstal and Burns report a surprising and interesting finding of unusually long 'mega' chromosomes (up to 15 times in length) in certain *Nicotiana* hybrids. Sansome gives cytogenetic evidence that the fungal class Oömycetes, in contrast to Ascomycetes and Basidiomycctcs, are diploid, with meiosis occurring just before gamete formation.

The section on nuclear structure includes two papers on DNA replications (in *Chironomus* and rye), one on the relationship between chromosomal reproduction and nucleolar synthesis, and the other (by La Cour) on the internal structure of nucleoli. The second of these deserves special attention. Several of the remaining papers in this section are concerned with (1) chromosome aberrations induced by chemicals and X-rays, (2) the possible molecular mechanisms of chromosome breakage and rejoining and (3) the genetic consequences of the aberrations. Individually, the papers report significant findings; but when viewed collectively, they fail to achieve the unified impression so desirable in a collection of this type.

The final section, which is on animal cytology, includes ten papers whose subject matter ranges from insects to rodents to man. Dietz, using a particularly favorable material (the first spermatocytes of a crane fly), demonstrates by cinematography (and by printed photomicrographs) that centrioles and asters are dispensable in chromosome distribution and cell division. Although the observation thus far is limited to this material, the conclusion may partly explain why higher plants lack centrioles. Geyer-Diszynska, in a very interesting paper, demonstrates that in *Cecidomyiidae* the development of germ cells is under the control of genetic factors in the supernumerary chromosomes. Several papers on mammalian cytogenetics are also included; special mention should be made of Hughes' detailed article on quantitative karyotype analysis.

The volume is finely printed and illustrated, and it is remarkably free of typographical errors. The prolonged lapse in time between the conference and the publication of the book is regrettable, however, and the inclusion of abstracts of papers at the end of the volume seems superfluous.

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Kjessler, B., â€œMonographs in Genetics,â€ Vol. 2, â€œKaryotype, Meiosis and Spermatogenesis in a Sample of Men Attending an Infertility Clinic,â€ Verlag S. Karger AG, Basel, Switzerland (1966).Google Scholar. 81. Kjessler, B., Meiotic studies in the human male, in: â€œModern Trends in Human Geneticsâ€ (A. E. H. Emery, ed.), Vol. 1, pp. 214â€“240, Butterworths, London (1970).Google Scholar. 82. Kjessler, B., Chromosomes and gametic output in 1000 infertile males, Excerpta Med.