carried from the estuary periodically with the outflowing tide. They gather at the ends of the breakwaters forming the narrow harbor mouth, and eventually, when the strength of the current has decreased sufficiently, make their way against it back into the estuary.

Two of the factors found to influence the entrance of sticklebacks into this estuary are (1) current and (2) low salinity, or something associated with it. Lyon[5] has described the orientation of fish in a current, and states that the normal tendency for a fish is to orient itself against the direction of current flow. Sticklebacks at the mouth of the Margaree exhibited just such a behavior. If they left their position in slowly moving water at the end of the breakwater to breast faster currents emerging from the river, they were carried back out again, but if the velocity of the outflowing water was not more than 1½ feet per second, their "cruising speed" was sufficient to take them into the harbor. At the turn of the tide, when the water became motionless, their orderly orientation was destroyed. With the commencement of the flooding tide, fish were seen to turn about and, stemming the current, make their way out of the estuary, which recalls Rutter's[6] account of the behavior of migrating quinnat salmon in San Francisco Bay. Such actions suggest the lack of any purposeful behavior in the migration of these fish, for they might be expected to swim in and regain their natural habitat at such times when entry could be most easily accomplished.

Sticklebacks at the mouth of the estuary were found to be attracted by river water. At the end of one of the breakwaters, they were frequently subjected to a second current of water in addition to that flowing from the estuary. Depending upon the direction of the wind, this second current consisted either of salt water from outside or of fresher river water which had left the estuary a short time before. In the latter case, fish would enter it in much the same manner that they breasted the current from the river, even though it did not lead into the estuary. When it was salt water that produced the current, fish shunned it. The results of an experiment performed with sticklebacks in a trough, in which they were subjected to currents of fresh and salt water of the same temperature entering at one end, gave added support to the indication that river water is attractive to these fish. Of the three dozen individuals used in the trough experiment, there were always twice as many fish in the current of river water as there were in the salt. *Menidia* and *Fundulus* reacted similarly. Whether the influence of the fresher water was due merely to its lower salt content or perhaps to the fact that it contained materials from the land was not determined.

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COMPOUND WORDS IN PRESENT-DAY ENGLISH

I WONDER if philologists and students of style have noticed that, at least in scientific writing, the English language is rapidly acquiring a facility in forming compound words comparable to that possessed by ancient Greek and contemporary German? Such is undoubtedly the fact. As yet, our technique is rather awkward; the elements of a compound are written as separate words, and the resultant construction, if taken literally, would often defy parsing. But its essential nature is quite clear.

The new usage seems to be wholly unpremeditated and instinctive. There is something in the air; though trained in quite different methods, I find myself unconsciously eliminating prepositions and compressing phrases into compound words.

Thirty years ago every one, probably, would have written "Department of Biology." Now half the colleges in the United States have "Biology Department," or the like, on their stationery. Certainly, thirty years ago no one would have put forth such a title as "Cost Analysis of Scholarly Periodical Printing." Then it would have read: "An Analysis of the Cost of Printing Scholarly Periodicals." In time, as we become more definitely conscious of what we are doing, it may read: "Costanalysis of Scholarlyperiodicalprinting."

The whole phenomenon may serve as an illustration of the mysterious manner in which changes in language (and some other things) take place. Learned men in any number might have argued for years that compounds were convenient, concise and generally desirable in English, and have produced no more effect than have the advocates of "reformed" spelling. But, all at once, there comes some sort of inner urge—some mental epidemic—and the thing is done.

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SPECIAL CORRESPONDENCE

SCIENTIFIC WORK OF THE TENTH SOKOL FESTIVAL

THE Sokol is a national movement conceived in 1862 by Dr. Miroslav Tyrš, lecturer in the history of art at the Czech University in Prague, as a means of stimulating the cultural and political regeneration of the Czech people. Abroad it is recognized largely as a gymnastic organization, but behind the pageantry

[5] E. P. Lyon, *Amer. Jour. Physiol.*, 12: 149–161, 1904.

[6] C. Rutter, *Bull. U. S. Fish Com.*, 22: 65–141, 1902.

of its mass drills lies an almost unsurpassed example of what may be achieved in the way of scientific research through voluntary cooperative effort. The impetus given to the Sokol movement by Tyrš and Fügner almost a century ago has been continuously kept alive, for in its ranks, which numbered 800,000 before Munich, have stood some of Czecho-Slovakia's most distinguished men. From its very inception the Sokol and its history have been colored by the names of scientists. Dr. Eduard Grégr, Jan Evangelista Purkyně's assistant in the Prague Physiological Institute, contributed to the drafting of the association's first statutes.[1] He records that Tyrš attended Purkyně's lectures, and there are indications that this great, nineteenth century experimental physiologist influenced the formulation of a Czech physical education nomenclature and the selection of the Sokol's fundamental exercise program. The aged Purkyně himself took part in the physical activities of the Sokol, being one of a group of celebrated scholars of the university who trained under the direction of Malypetr. It is not strange, therefore, to find that from this heritage has grown an idea of service to the Sokol through science, which finds among its several outlets an admirable program of research pertaining to exercise.

Once every six years a Sokol Congress is held in which as many as 100,000 persons of both sexes participate, ranging in age from elementary school children to adults in the fourth and fifth decades. Medical examination is compulsory before entering into competition. Some of the events require great strength and neuromuscular skill, but the majority are adjusted to the capacities of average individuals in good health, accustomed to systematic exercise of a moderate type. The participants in the Pan-Sokol Festival are selected in preliminary district trials and thus probably represent the best physical specimens of the community at large. It is evident that the Sokol Slet offers a unique opportunity of assaying the physical status of a people and of studying innumerable problems in the physiology of exercise.[2]

At the instigation of medical research groups within the membership of the Sokol, a wooden building was constructed in 1932 to house rooms for scientific investigation and first aid during the ninth Slet. Since then the Ministries of Public Health and Physical Education, Public Works and Finance have erected an excellent research institute in the new northern wing added to the chief tribune of the Masaryk State Stadium at Strahov, Praha.[3] This included a series of rooms so arranged that large numbers of subjects might pass from one division of the examination to the next without interruption. Dressing rooms were so placed that either men or women might enter special units, such as the x-ray room. There was space for an electrocardiagram, a dark room, chemical laboratory and a surgical unit consisting of a preparation room, operating room and a sick room, the latter reserved for injuries or gynecological accidents too severe to permit the moving of patients to a hospital. The surgical unit was equipped without cost by Anýž and by Čížek. Its work was carried on by Professor Jirásek, chief of the First Surgical Clinic of Charles University, and the volunteer services of members of his medical and nursing staff. Vinopal loaned and installed without recompense two large x-ray units, the first of complete Czech make (Meta), and Foma contributed a fine grade of x-ray paper of Czech manufacture.

Early in the year all clinics were given an opportunity to submit projects for the tenth congress to a committee of the Sokol. This work was administered by Docent Jiří Král, Faculty of Medicine, Charles University, and a member of the League of Nations Committee of Experts on Physical Education. A brief résumé of the studies undertaken between May 29 and July 6, 1938, follows:

Dr. Klímová-Fügnerová, physician of the State Institute of Hygiene, and Dr. Záhoř examined the vision of Sokol children.[4] For those with acuity less than 5/10, ophthalmoscopic examination was provided. Dr. Klaus, of Professor Jerie's First Gynecological Clinic, Charles University, granted consultations to women participants in the upper age groups, studying the gynecological troubles appearing during the days of most strenuous exercise. Professor Ostrčil and his associates in the Second Gynecological Clinic, investigated the menstrual cycle of adolescent participants. Calendars were distributed, to be returned to the clinic after six months. His object was partly educational, that of teaching the young girl the importance and values of an accurate calendar record of the menstrual rhythm. At the previous Slet, Dr. Tillerová-Šebková had conducted an extensive interrogatory study to ascertain the influence of Sokol exercise upon child-bearing.[5] It had been suggested that labor is more difficult among those who participate in athletics. Professor Jirásek determined by x-ray and clinical examination the status of the joints of runners and the influence of their activity upon them.[6] Dr. šiška, member of the second surgical clinic Charles University under the direction of Professor Diviš, studied the feet of the same runners and

[1] J. Masák, *Tyršův Sborník*, 9, 1924.
[2] J. Král, *Věstník ČSl.Lékařů*, 50: 1030, 1938.
[3] M. Vejchoda-Ambros, *Ministry of Pub. Health and Phys. Ed.*, Praha, 1938.
[4] M. Klímová-Fügnerová, *Věstník ČSl.Lékařů*, 50: 1037, 1938.
[5] Z. Tillerová-Šebková, *Praktický Lékař*, 16: 175, 1936.
[6] A. Jirásek, *Věstník ČSl.Lékařů*, 50: 1032, 1938.

checked the condition of operated hernias among male participants.

Under the leadership of Dr. Račanský, chief orthopedic surgeon of the Bat'a Hospital at Zlin, 10 physicians from Zlin and 10 consultants from the clinics of Professor Zahradníček and Professor Frejka made foot measurements, plantograms and noted foot defects. They were assisted by 10 technicians from the Bat'a factory, who are normally employed as modelers for shoe lasts. Record cards in different colors lightened the work of separating the data accumulated on country and city children. The incidence of various foot defects in young people was studied, and those requiring medical attention were directed toward proper treatment. From the measurements and plantograms, the foot types of children will be determined and lasts constructed for shoes to fit these feet. Dr. Gellért, director of the Department of Internal Medicine of the Bat'a Hospital, investigated constitutional types among Sokol boys, studying in particular the relationship of habitus to foot defects, especially to flat feet. About 1,500 children were examined in this series of studies alone, and the work was entirely financed by the Bat'a factory.

Professor Hynek, chief of the First Clinic of Internal Medicine, Charles University, Docent Král and Dr. Baštecký made teleroentgenograms of the hearts of 500 Sokols. During the last Slet they had studied the post-exercise decrease in the size of the heart,[7] and had observed the frequency of mitral configuration in young adult men and women.[8] This year they added observations on adolescent boys and on men selected from amongst the oldest competitors. Electrocardiograms were also made on the latter group. It is Professor Hynek's ultimate plan to compare these large series of teleroentgenograms with observations on sedentary subjects, contributing to the still open question of the influence of exercise upon the heart. Professor Prusík, of the Propedeutic Clinic, commenced a study of syncope during the last Slet. Working with Professor Vondráček, the project was continued, making blood chemistry studies and observing the efficacy of the administration of salt as a preventative against fainting.[9]

The whole of this program was conceived and executed by Sokols. Professional services, furnishings, costly equipment and valuable supplies were voluntarily contributed. The actual research was conducted by experienced investigators under the leadership of men of the highest rank in the medical profession of Czecho-Slovakia, most of them connected with the Medical Faculty of the Czech University in Prague. All Sokols, familiar with the philosophical and practical aspects of this organization's exercise program, they were in a unique position to appreciate its problems, sense their importance and bring to bear upon them the fruits of a rich and varied scientific experience. Therein probably lies the motivating force behind the scientific work of the Tenth Sokol Festival.

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SPECIAL ARTICLES

THE EFFECT OF SEX HORMONES ON THE NORMAL RESISTANCE OF RATS TO CYSTICERCUS CRASSICOLLIS[1]

IT is generally recognized that sex is an important factor in the incidence and severity of certain diseases. Experimentally, this is especially apparent in working with controlled larval tapeworm (*Cysticercus crassicollis*) infections in rats where, in most cases, the degree of infection in normal females is only about 60 to 80 per cent. of that found in normal males.[2] That this sex difference is statistically significant is clearly shown by the investigations of Curtis, Bullock and Dunning.[3] In order to ascertain whether this sex difference could be altered by sex hormones, theelin and testosterone propionate[4] were injected into normal male and female rats, which were subsequently infected with a standardized dose of *Taenia taeniaformis* eggs.

A preliminary experiment carried out with the aid of Mr. I. G. Arnason suggested that the degree of infection might be altered under certain conditions by the injection of sex hormones. However, since the degree of the experimental infection was too low to afford adequate analysis, the work was repeated and the following more significant results were obtained which for the most part confirmed the earlier observations.

The animals were young adult virgin female and male albino rats weighing approximately 100 grams.

[7] J. Král and B. Polland, *Časopis Lékařů Českých*, 73: 541, 1934.

[8] K. Hynek, J. Baštecký and J. Král, *Cong. International de Méd. Appliqué a l'Éd. Phys. et aux Sports*, Chamonix-Mont Blanc, 1934.

[1] This investigation was aided in part by the Mr. and Mrs. Frank G. Logan fund and in part by a grant from the Rockefeller Foundation to the University of Chicago.

[2] By personal correspondence, it has been learned from Dr. V. N. Moorthy, of the India Health Service, that a similar condition exists in human infection of *Dracunculus medinensis*. Under conditions in which males and females are equally exposed to infection, the disease is less prevalent in the latter.

[9] B. Prusík, *Věstník ČSl.Lékařů*, 50: 1033, 1938.

[3] M. R. Curtis, W. F. Dunning and F. D. Bullock, *Am. Jour. Can.*, 17: 894, 1933.

[4] The theelin was supplied by Dr. Cartland, of the Upjohn Company, and the testosterone proprionate by Dr. Schwenk, of the Schering Corporation.