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.

Methods used for determining the resistance of rats against infection with *C. crassicollis* have been previously described by the author.[5] Fifteen males and 15 females in one group were given 14 consecutive daily injections of 0.5 cc of sesame oil alone. Fifteen males and 15 females in a second group were given 14 consecutive daily injections of 0.5 cc sesame oil containing 0.005 mgm (5 International Esterogenic units) of theelin. A third group of 15 males and 15 females received 14 daily consecutive injections of 0.5 cc of sesame oil containing 0.6 mgm (equivalent to 40.2 International Androgenic units) of testosterone proprionate. All animals were inoculated at the time of the last injection. Seven weeks after infection the animals were sacrificed and the average number of parasites (cysts) determined by macroscopic examination of the livers. The average degree of infection in each group is given in Table 1. The normal sexual

TABLE 1

THE AVERAGE NUMBERS OF *Cysticercus crassicollis* FOUND IN NORMAL RATS AND IN RATS TREATED WITH EITHER THEELIN OR TESTOSTERONE PROPIONATE

Group	Number of rats and sex	Treatment	Average number of cysts (± P.E.)
1	15 males	Sesame oil	62 (± 2.15)
	15 females		42 (± 2.06)
2	15 males	Theelin	50 (± 2.49)
	15 females		45 (± 1.62)
3	15 males	Testosterone	64 (± 1.97)
	15 females	propionate	60 (± 2.86)

variation in resistance to infection is clearly brought out in Group 1. For example, the average infection of the control group of females was only 67 per cent. ($42 \times 100/62$) of that found in the control group of males (difference of 20 ± 3.1). The infection in females which received theelin was essentially the same as the untreated controls (3 ± 2.6), but the males which received theelin showed a slightly lower degree of infection than the untreated control males (12 ± 3.2). The theelin appeared to increase the resistance of males slightly, and the results probably would have been more pronounced had the animals been castrated. On the other hand, females which received male sex hormone showed a marked decrease in resistance to infection as compared to the normal females (18 ± 3.5), which was approximately the same as that shown by the untreated control males, whereas males which received male sex hormones showed no change in resistance.

It appears, therefore, that the normal sexual variation in resistance of rats to *C. crassicollis* can be modified by the injection of sex hormone, but any explanation of such reactions must await further investigations on the physiological and cellular effects of such substances.

[5] Dan H. Campbell, *Jour. Immunol.*, 35: 195, 1938.

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THE ANTIDERMATOSIS VITAMIN REQUIRED FOR REPRODUCTION IN THE DOMESTIC FOWL

THE antidermatosis vitamin[1] is the water-soluble factor which prevents the dermatosis or pellagra-like syndrome of the chick, first described by Ringrose and Norris[2] and obtained in aggravated form on the Wisconsin heated diet.[3] Although dermatosis in chicks has been frequently observed in the experimental laboratory, no evidence that the mature fowl suffers from a deficiency of this vitamin has yet been reported. Hence a study of this problem was initiated, the results of which are presented in this report.

White Leghorn pullets were used as the experimental subjects in this study. The control group of pullets was fed the following diet, designated the normal diet:

	Per cent.
Yellow corn meal	40.65
Wheat bran	20.00
Wheat flour middlings	20.00
Purified casein	7.00
Liver extract	0.35
Soybean oil	5.00
Wheat germ oil	0.50
Cod liver oil	0.50
Pulverized limestone	3.50
Steam bone meal	2.00
Iodized salt	0.50
Manganese carbonate	trace

The remaining pullets were fed the same diet except that the cereal portion and the liver extract were heated in an oven for 36 hours at 120° C. in order to destroy the antidermatosis vitamin. This diet was designated the heated diet.

By proper attention to composition and through appropriate biological assays the heated diet was demonstrated to contain all the vitamins known to be required by the domestic fowl or not yet shown to be required, with the exception of the antidermatosis vitamin and the new growth and reproduction factor reported by Bauernfeind *et al.*[4,5] These are vitamins A, B_1, B_4, B_6, D, E, K, riboflavin (G), nicotinic acid and the antiencephalomalacia factor.

[1] Called filtrate factor by the California workers.

[2] L. C. Norris and A. T. Ringrose, SCIENCE, 71: 643, 1930.

[3] O. L. Kline, J. A. Keenan, C. A. Elvehjem and E. B. Hart, *Jour. Biol. Chem.*, 99: 295, 1932.

[4] J. C. Bauernfeind, A. E. Schumacher, A. Z. Hodson, L. C. Norris and G. F. Heuser, *Proc. Soc. Exp. Biol. and Med.*, 39: 108, 1938.

[5] J. C. Bauernfeind, A. E. Schumacher, A. Z. Hodson, L. C. Norris, and G. F. Heuser, *Poul. Sci.*, 17: 444, 1938.