cm, $r_1' = 10.20$ cm, $r_1'' = 10.25$ cm and hence $C_1'' = 10.25$ e.s.u. and $C_1 = 510$ e.s.u.

Case 1. $\kappa = 1$. Then $100Q_4/Q_1 = 89.08\%$, $100\ Q_3''/Q_1 = 1.79\%$, $100\ Q_3/Q_1 = 90.87\%$, $100\ Q_2''/Q_1 = 3.62\%$, $100\ Q_2/Q_1 = 94.48\%$, $100\ Q_1''/Q_1 = 5.52\%$. Formulas (1) and (2) give $C = 136.207$ and $C = 127.5$ respectively, hence the error of equation (2) is about -6.4% in this special case.

Case 2. $\kappa = 80/17 = 4.706$ (paraffin oil). $C_1 = 2400$ e.s.u. $100\ Q_4/Q_1 = 97.49\%$, $100\ Q_3''/Q_1 = 0.42\%$, $100\ Q_3/Q_1 = 97.91\%$, $100\ Q_2''/Q_1 = 0.83\%$, $100\ Q_2/Q_1 = 98.74\%$, $100\ Q_1''/Q_1 = 1.26\%$. Formulas (1) and (2) give $C = 608.915$ and $C = 600$ respectively, hence the error of equation (2) is now about -1.5%.

In conclusion, attention may be called to the fact that it can be shown, by paying special attention to the definitions involved, that the general ideas presented above can be extended to the case of parallel-plate condensers.

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FURTHER OBSERVATIONS ON ADRENALECTOMIZED CATS TREATED WITH AN AQUEOUS EXTRACT OF THE SUPRARENAL CORTEX

IN a brief communication which appeared in this journal a few weeks ago (SCIENCE, 71: 321–322, 1930) the writers described the preparation of an active extract of the suprarenal cortex which maintains bilaterally adrenalectomized cats in normal condition. At the time of publication our oldest experimental animals had been under observation eighty days. Several of our treated cats recently reached their one-hundredth day of survival and were in excellent condition at that time. They all showed steady weight increases and could not be distinguished by their behavior from unoperated control animals.

At present we have no idea how long cats so treated will survive, since none of the animals receiving extract has presented symptoms, and so far as we know to the contrary they would survive indefinitely. However, when the animals reach the hundredth day of survival administration of extract is discontinued, and in every case tested death from adrenal insufficiency results within ten days. The onset of symptoms is abrupt, more so than in adrenalectomized cats not receiving treatment. Autopsy reveals the same findings as observed in untreated animals dying of adrenal insufficiency. The fact that the long surviving cats invariably die with typical adrenal insufficiency symptoms following cessation of treatment demonstrates conclusively that it is the extract which keeps them alive and in good health, and that no question of accessory cortical tissue is involved. We have used chiefly male cats in our survival experiments.

The following table shows the weight changes in a typical experimental cat. The striking weight loss which follows withdrawal of treatment is characteristic of all our animals.

TABLE I

No. 1 MALE				
Dec.	16	3160	grams.	R. adrenal removed.
Dec.	24	3185	"	L. adrenal removed. Treatment started Dec. 25.
Jan.	28	3320	"	
Feb.	12	3300	"	
March	5	3420	"	
March	12	3500	"	
March	22	3765	"	
March	30	3820	"	
April	3	3835	"	Extract discontinued. Animal in perfect health.
April	7	3630	"	
April	8	3610	"	Symptoms of suprarenal insufficiency.
April	9	3515	"	Symptoms of suprarenal insufficiency.
April	10	3400	"	Marked symptoms.
April	11	3355	"	Prostration, death.

Recently we have completed a series of experiments in which the adrenalectomized animals were not treated until adrenal insufficiency symptoms had developed, such as total anorexia, weight losses of several hundred grams and weakness in limbs so that the animal swayed unsteadily when walking. By injecting subcutaneously 2 cc of cortical extract three times daily, we have been able to bring such cats back to normal health, with complete disappearance of all symptoms of adrenal insufficiency. Following return to normal the animals are then given the regular treatment of 0.5–1 cc of extract per kilogram of body weight daily. This is an arbitrary dose since the minimum dosage has not been determined. We have several such animals in the laboratory which have returned to normal and are now in their fiftieth day of survival.

It is interesting to note that the disappearance of adrenal insufficiency symptoms is a fairly slow process and requires from four to five days of treatment. The maximum quantity of fluid given in twenty-four hours to any one cat showing symptoms is six cubic centimeters. This amount can be cut in half by further concentration of the extract and the results are the same.

It has been found that the fractions containing the cortical hormone can be conveniently and safely

stored in benzene or alcoholic solution. The writers prefer to use the term *cortical hormone* pending definite knowledge of the chemical nature and physiological function of the hormone or hormones involved. Further fractionation experiments are in progress.

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CERTAIN BIOLOGICAL EFFECTS OF HIGH FREQUENCY FIELDS

BIOLOGICAL utilization of the electromagnetic spectrum has only recently spread into the region between radio and infra-red rays, with promise of revealing a useful field. The material and methods used in the present study have some advantages in outlining the problems to be taken up in a subsequent detailed analysis of the biological effects of this physical force.

A preliminary survey of the individual variation in

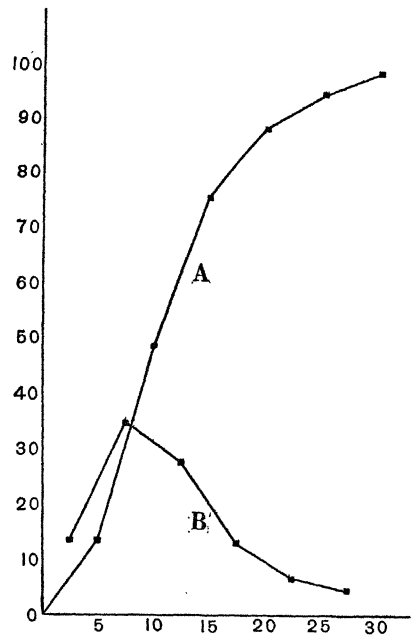

FIG. 1

Abscissae represent time of exposure in seconds; ordinates, per cent. of exposed wasps dead after twelve hours.

response of *Habrobracon juglandis*, a parasitic wasp, to the same dosage in a high frequency electrostatic field is here reported. Exposure was made at 3.5 meter wave-length and auxiliary circuit current of 1.8 amperes.

Material, nearly random as to age, sex, condition of feeding and metabolic state, as determined by temperature at which wasps have been kept, was used.

Wasps placed together in the field for the same length of time may be apparently lifeless, normal or in any intermediate condition at the end of the exposure.

Effects of the field were measured by lethality, which can not be determined immediately, since apparently lifeless individuals may recover, and normals die, within the first few hours after treatment. Groups of ten to fifteen were exposed together, and counts of living and dead were made twelve hours later when individuals could be assigned definitely to either group.

Curve A shows totals of such counts, expressed as percentage of total exposed which were dead after twelve hours, treatments being for five, ten, fifteen, twenty, twenty-five and thirty seconds. Curve B shows the increase in lethal percentage at each dosage over that of the next smaller exposure; it expresses the percentage of individuals expected to die within $\pm$ 2.5 seconds of each exposure time. The average time for death was 11.41 $\pm$ .09 seconds of treatment. The coefficient of variability was 56.27 $\pm$ .74 per cent., determined from 2,159 wasps.

An attempt is being made to determine any possible part age, sex, feeding and metabolic state may play in the wide range of individual susceptibility to the high frequency field, first observed by others in mice, by testing the range of variability under the action of each factor separately, the other three being kept constant.

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BOOKS RECEIVED

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