the non-blocked, which would follow if the reticulo-endothel tended to enhance chemotherapeutic activity. In 3 experiments out of 5 (twice with neoarsphenamine, once with arsphenamine) we found that the blood of blocked animals was more active than that of non-blocked. In 2 experiments the difference was small but constant on repetition. In another experiment in which 250 mg. per kilogram was injected, bleeding 3 hours later, animals lived twice as long as those infected with trypanosomes treated with non-blocked, arsenic plasma, although these also showed a marked protection. Arsenic content of plasma was in these cases higher in blocked animals than in non-blocked. The arsenic content of the liver did not differ in blocked and non-blocked animals, whereas the non-blocked spleen usually contained more arsenic than the blocked.

We conclude that *"blockade" does not inhibit the formation* of the parasitotropic agent in the host, but rather may enhance it. Since the blockade tends to increase the arsenic content of the blood of animals treated with arsenicals, it is probable that the increased activity is due to an increased concentration of the active principle. But the possibility should not be overlooked that other changes of the blood plasma produced by the blockade[16] may have influenced the results of our experiments. That the reticulo-endothelial system was "stimulated" is not probable, for we used large doses of india ink and found changes in the distribution of arsenic which must be attributed to a fairly high degree of blockade.

4973

Relation of Temperature to Nutrition and Resistance.

I. J. KLIGLER AND A. GEIGER.

From the Department of Hygiene and Bacteriology, Hebrew University, Jerusalem.

With our studies on the effect of external environment on susceptibility and resistance of animals to infection, we are also studying the indirect effect through the influence on the nutrition. We[1] found that rats fed high fat-containing diets (20-35% of the calory

[16] Wichels, P., *Z. ges. exp. Med.*, 1926, liii, 287.

[1] Geiger, A., Mueller, R., and Kligler, I. J., *Biochem. Z.*, in press.

requirements) in the form of vegetable oil or cocose, showed marked loss in weight and other unfavorable symptoms as well as decreased resistance to infection. These effects appeared to be more marked during the summer than during the fall season of the year. We, therefore, undertook a more systematic study of the relation of external environment to nutritive requirements, namely the relation of temperature to the metabolism of vegetable fats.

The procedure consisted in observing parallel groups of rats kept at different temperatures and maintained on identical diets. The animals were about 6 weeks old at the start of the experiment and received a daily ration of 22 to 25 calories. The following is a typical experiment:

Four groups of rats, 3 males and 3 females per group, were used. Two of the groups were kept at a temperature range of 17-20°C. and the other two at 28-30°C. The diets were as follows:

The rats of cage I (animal house) and cage III (incubator) received daily:

Whole wheat bread	5.4 gm.
Milk	2.0 "
Casein	0.5 "
Olive oil	1.0 "
Total	8.9 "

The rats of cage II (animal house) and cage IV (incubator) received daily:

Whole wheat bread	5.4 gm.
Milk	2.0 "
Casein	0.5 "
Olive oil	0.25 "
Total	8.15 "

TABLE I.

Duration of a Trypanosome infection* in rats maintained on various fat diets at different temperatures.

No. of cage	No. of rats	Weight at time of infection	Temperature	Diet: olive oil gm.	Incubation period Ave. days	Illness Ave. days
I	6	76.5 gr.	17-20°C	1.00	3.3	11.6†
II	6	72.5 "	17-20°C	0.25	5.3	15.0
III	6	56.5 "	28-30°C.	1.00	3.16	10.2
IV	6	68.5 "	28-30°C.	0.25	3.66	13.0

* Each rat received 32,000 *Tr. evansi* intraperitoneally.

† The median durations of infection were as follows: I = 11 days; II = 15.5 days; III = 10.2 days; IV = 13.5 days.

The results of average weight at 13 weekly intervals shows that while at 20°C. there is relatively little difference in the growth curves of the 2 sets of rats, at 28°C. the difference is quite marked.

At the end of the experiment these rats were infected with *Tr. evansi.* The results, summarized in Table I show that the duration of the infection parallels the growth curves. The animals showing a better growth curve are more resistant, while those showing a retarded growth curve manifested a lower resistance.

These experiments indicate that not only does the external temperature influence the resistance of animals directly[2] but that it may do so indirectly by its effect on metabolism. These experiments are also suggestive in connection with the whole problem of climate and nutrition—a problem which has heretofore not been a subject of experimentation.

4974

Experimental Ostitis Fibrosa Cystica in Dogs.

HENRY L. JAFFE AND AARON BODANSKY.

From the Laboratory Division, Hospital for Joint Diseases, New York City.

In previous reports the production in the guinea pig of fibrous bone lesions by injection of parathyroid extract was described, as well as its effects on the serum calcium and phosphorus.[1,2] The production in dogs of *ostitis fibrosa cystica* is possible, but more difficult. The difficulty lies in the fact that in the dog doses of parathyroid extract (Parathormone Collip) necessary to produce marked resorption of the bone and marrow injury, are liable to lead to fatal hypercalcemia before there is much fibrous repair.

We studied eleven growing puppies for periods from 10 to approximately 180 days. They were under the influence of increasing doses of parathormone. We produced, depending upon the dosage and the length of time under parathormone, all degrees of change from mild bone resorption and slight fibrous replacement of the marrow to severe bone resorption and degeneration of the marrow with hemorrhage, when the animals died from overdosage. Finally,

[2] Kligler, I. J., and Olitzki, L., *Science,* 1929, lxx, 45; *Am. J. Hyg.,* in press.

[1] Jaffe, H. L., Bodansky, A., Blair, J. E., PROC. SOC. EXP. BIOL. AND MED., 1930, xxvii, 710.

[2] Bodansky, A., Blair, J. E., and Jaffe, H. L., PROC. SOC. EXP. BIOL. AND MED., 1930, xxvii, 708.