findings suggest that the alteration in the composition of the blood serum following partial hepatectomy may in effect be the decrease of the concentration of certain constituents which at their normal concentrations exert a growth inhibitory action. Such a decrease, then, could account both for the enhancing effect of such serum on the growth response of tissue cells *in vitro* and the initiation of liver cell proliferation *in vivo* which follows partial hepatectomy. Further work is in progress in order to test in a direct way the validity of this hypothesis.

In their work on regeneration in parabiotic rats, Bucher, Scott, and Aub(9) suggested that chemical entities in the blood when present in sufficient quantities may cause the proliferative response in the liver. An elevated concentration of such substances was considered by them to be the stimulus initiating liver cell division following partial hepatectomy(9). The findings of the present work do not provide evidence in support of such a concept. On the other hand, their experimental findings concerning the induction of mitotic activity in the intact liver of one of the partners of a parabiotic pair by partial hepatectomy performed on the other are in complete agreement with the findings of the present work and can readily be interpreted on the basis of the hypothesis previously discussed.

Summary. On the basis of a comparison of the action of blood sera from partially hepatectomized and control rats on the growth response of tissue cells *in vitro* an hypothesis was formulated with regard to the induction of the regenerative process in the liver which follows partial hepatectomy. According to this hypothesis certain constituents of normal blood serum exert a growth inhibitory action at their normal concentrations. Partial hepatectomy reduces the amount of functioning hepatic tissue thereby resulting in a decrease of the serum concentration of these constituents. This in turn results in the initiation of regenerative growth in the liver. Further evidence supporting this hypothesis was obtained by the induction of cell division in the intact liver of adult rats by decreasing the concentration of serum constituents *in vivo* through plasmapheresis.

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Pricking Pain Threshold in Different Body Areas.* (19644)

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Although pain threshold measurements are customarily made using the forehead as the test surface, it is often desirable to use other body areas for this purpose. Measurements of cutaneous hyperalgesia or hypalgesia in a particular locality should properly include control measurements on the opposite side or have reference to measurements made on

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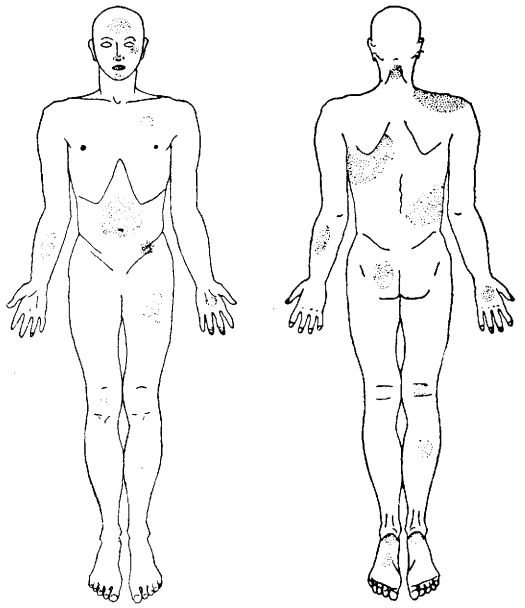

FIG. 1. Survey of sensitivity of various body regions. Stippled areas indicate regions of body surface on which pain threshold measurements were made.

normal subjects. Lack of definite information on this point has handicapped investigations in this laboratory(1,2). Whether the skin varies appreciably in its sensitivity to noxious stimulation in different body areas was also of sufficient interest in itself to warrant an investigation of the matter.

Method. The technic for measuring pain threshold by thermal radiation was used to make a survey of pain threshold level over the body surface. The skin surface to be tested was coated with India ink and the intensity of radiation just evoking a report of pain after a 3-second exposure was taken as the pain threshold. Just prior to each test the skin temperature was measured with a radiometer. Seven healthy subjects were used in these tests, 5 male and 2 female, all of whom were experienced in the recognition of the pricking pain threshold. The areas of the body upon which threshold measurements were made are shown in Fig. 1. Three test sites within each area were used and 3 measurements were made on each site. Room temperature during these tests was 20-25°C, and areas to be tested were exposed only during the time required to obtain a measurement.

Results. The results of the survey are shown in Table I, in which are given the average of the 63 values obtained for each body area, together with the standard deviations from the mean. The values given in the table have been corrected for temperature difference by the formula(3) $Q_{34} = Q + 20(T_s - 34)$ in which Q_{34} = pain threshold for a skin temp. of 34°C, Q = measured pain threshold, T_s = temperature of the area of skin being tested. It has been shown that correction for variations in skin temperature is necessary.

Also given in the table are the average values of skin temperature attained at the end of the 3-second exposure to the average threshold stimulus for each area. This temperature can be computed from a knowledge of the initial skin temperature, measured prior to ex-

TABLE I. Pricking Pain Threshold Measurements on Various Parts of the Body.

Skin area	Final skin temp., °C	Avg pain threshold, mc/sec/cm²
Forehead	45.7 ± 1.3	235 ± 27
Cheek (zygoma)	44.6 ± 1.3	210 ± 27
Nose	44.8 ± 1.6	215 ± 32
Lips	44.1 ± 1.9	200 ± 38
Chin	45 ± 1.3	220 ± 27
Chest	44.8 ± 2.2	215 ± 44
Nipple	43.8 ± 1.6	200 ± 32
Abdomen	43.9 ± .9	200 ± 18
Groin	43.3 ± 1.2	185 ± 24
Thigh (post.)	42.8 ± 1.4	175 ± 28
Thigh (ant.)	42.6 ± 1.4	170 ± 28
Knee cap	42.7 ± .9	175 ± 18
Popliteal space	43.5 ± 1	190 ± 20
Calf	43 ± 1.4	185 ± 28
Shin	43.9 ± 1.1	190 ± 22
Ankle	44 ± 1.1	190 ± 22
Dorsum of foot	43.2 ± 1.4	180 ± 28
toes	43.4 ± 1.7	185 ± 34
Arch	44.3 ± 1.4	200 ± 28
Heel	53.7 ± 2.2	390 ± 44
Heel, corneal layer shaved off		250
Shoulder	44.8 ± 1.8	215 ± 36
Nape of neck	43.8 ± 1.2	195 ± 24
Upper back	43.5 ± 1.6	185 ± 32
Middle	43.8 ± 1.2	195 ± 24
Lower	42.2 ± 1.4	160 ± 28
Buttock	42.4 ± 1.9	165 ± 38
Upper arm	43.4 ± 1.7	185 ± 34
Forearm, volar surface	44.4 ± 1.6	210 ± 32
outer	44 ± 1.2	200 ± 24
Back of hand	43.8 ± 1.6	195 ± 32
Finger pad	47.1 ± 2	260 ± 40
nail		215 ± 15
Palm (center)	45.1 ± 1.7	220 ± 34
over callus	45.6 ± 1.8	230 ± 36

posure, and the magnitude of the threshold stimulus(4). It has been pointed out that this value is more pertinent to the pain threshold, as determined by thermal stimuli, than radiation intensity or other measured quantity.

The values for male and female subjects have been included in the average as there was no significant difference in the measurements.

Comment. The pain threshold is approximately uniform over the body surface, as measured by the thermal radiation method. However, the heel of the foot has a significantly higher threshold due to the thick corneal layer of skin, but on the palm of the hand over a callus no significant elevation was observed. The finger pad threshold, on the other hand, exceeded the average for the body as a whole. Thresholds on the lower back, buttocks, and anterior and posterior aspects of the thighs were significantly lower than those on the forehead. This may be due to a thinner layer of stratum corneum overlying the pain endings in the back, although definite information on this point is lacking.

Summary. Using the thermal radiation method measurements on 7 subjects, the highest pain threshold values (390mc/sec/cm^2) were obtained on the heel of the foot. The lowest values of pain threshold (166-170 mc/sec/cm^2) were found on the lower back regions, buttocks, and thighs. Pain thresholds on all other body areas were approximately the same as that on the forehead.

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Localizing Properties of Anti-Rat-Aorta Antibodies.*† (19645)

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In order to investigate the localizing properties of antibodies prepared against a blood vessel which is not contained in any specific organ, we have studied antibodies prepared against rat aorta and are reporting the results here. Our interest in the *in vivo* localization of anti-blood-vessel sera stems from the evidence we presented that the localization of anti-kidney, -lung, and -liver antibodies in the liver, kidney and lung, as demonstrated by the use of radiolabeled antisera, takes place on the vascular bed of the organ(1,2). Antigenic differences have been found in the liver, kidney and lung with respect to their ability to localize antibodies, since the *in vivo* purification of anti-tissue sera yields antibodies of increased specificity for individual organs(1,2). Superimposed on these differences are antigenic similarities, because antibodies prepared against any one organ can localize in the others. Our present communications show that aorta also gives rise to antibodies capable of localizing in the liver, kidneys and lungs.

Experimental. Anti-rat-aorta sera were prepared as follows: aortas were excised from Sherman albino rats, scraped free of adherent tissue, washed and homogenized. Two rabbits received eleven injections each of 0.5 to 2 ml of a 10% aorta suspension on alternate days and were bled one week after the last injection. The sera were anti-RA452 and anti-RA457. Normal serum was obtained (NS 457) from rabbit 457 before immunization. The separation of the globulin fraction of the serum, the iodination thereof, the assay procedure and the details of the *in vivo* puri-

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