Introduction

In recent years our laboratories have been engaged in the study of regional and segmental variations in sympathetic activity, as revealed by cutaneous sudomotor and vasomotor manifestations. Studies of electrical skin resistance (ESR), reported in this Journal in 1958, revealed persistent areas of low electrical skin resistance in most individuals. The topographical distribution or "pattern" of these low resistance areas varied from individual to individual; but in a given individual, the distribution, with respect to right and left sides and segmental levels, remained constant for weeks, months and sometimes for as long as three or four years. Studies of regional and segmental variations in cutaneous vasomotor activity also revealed topographical "patterns" that remained similarly characteristic and constant for each subject.

That these measurements and patterns of ESR as recorded by our methods reflect variations in sympathetic activity was shown by the studies of Thomas and Korr and Kawahata and Thomas. Although these studies did not reveal the physiologic origins or functional significance of the sympathetic hyperactivity manifested in the low resistance areas, their distribution, that is, the patterned differences in sympathetic activity, were in some individuals apparently related to visceral or myofascial disturbances. Reports of areas of hyperhidrosis or low skin resistance, lowered skin temperature and cutaneous pallor reflexly related to painful myofascial and visceral conditions also suggest such a possibility.

In view of the possible physiologic and clinical implications of the topographical variations, asymmetries and local aberrations in sympathetic activity, it becomes important to determine whether similar variations in sympathetic activity are reflected by other cutaneous manifestations such as skin temperature, blood flow, and capillary peristalsis. This report is a preliminary report of such a study.

These investigations were supported in part by grants from the National Institutes of Health, Public Health Service (H-1632), and from the American Osteopathic Association.
activity, we have attempted to explore factors that might contribute to them. This report deals with the effects of experimentally induced irritations and stresses in musculoskeletal tissues on the patterns of cutaneous sudomotor activity.

**Methods**

Since the methods we have used for the study of sudomotor activity have been previously described \(^1\), \(^{20}\), \(^{21}\), they are only briefly characterized here.

**ESR Explorations**

The experiments reported in this paper were done over a period of several years. During this time three methods for recording ESR were used, each yielding a different type of record. However, all three methods are based on conventional principles of skin resistance measurement.

Essentially, each method consists of measuring or recording, in correct spatial relationship to the explored area, the *momentary* current flow through the skin in contact with a constantly moving exploring electrode, at known voltages. The voltages were tapped stepwise from a series of dry cells and applied to an electrode fixed to an earlobe and an exploring electrode. Resistance of the skin of the earlobe was minimized by means of electrode paste. Area-to-area differences in current flow at a given voltage, therefore, were due to differences in the "resistance" of the skin under the exploring electrode.

1. **Explorations with Hand-held Electrode:**

   In our earlier studies we used an instrument similar to that described by *Jasper* \(^{22}\). Current flow was read from a microammeter as the electrode was moved over the subject's skin. Figures 1 to 6 and 16 to 18 show charts obtained with this method.

2. **Automatic Explorations:**

   In later studies a mobile automatic dermometer was developed \(^{21}\). With this instrument skin resistance patterns on large areas of the dorsal trunk were recorded directly on paper by recording galvanometer whose amplitude of oscillations is related, through an amplifier, to the skin current. The position of the galvanometer writing-point on the chart was related to the position of the exploring electrode on the subject by means of a pantograph. Records obtained with this instrument appear in Figures 8, 9, 11, 12, 14, 15. Records obtained with an earlier automatic dermometer (*Thomas* and *Korr* \(^{20}\)) are not included in this report.

**Exploration Conditions**

The explorations were conducted in a quiet room maintained between 23° and 25° C. The body was unclothed above the level of the sacrum. The tips of the spinous processes were located by palpation and marked on the skin. In these studies, "segmental" level refers to the topographical