

hours, frequency 140 decreasing to 108; after injection into right ear several days later: nystagmus to left 3½ hours' duration, frequency 102 decreasing to 76).

**Summary.** In cats, paralysis of the labyrinth can be obtained by electrophoresis of cocain solutions from the external auditory meatus. In cats and dogs, such an effect can

be produced by injection of local anesthetics into the tympanic cavity. The effect can be prolonged by combination of the local anesthetic with vasoconstrictors. The use of such intratympanic injections for the treatment of abnormal states of labyrinthine irritation is proposed.

## 14624 P

### Insensible Perspiration and Keratinization Process.

STEPHEN ROTHMAN AND ZACHARY FELSHER. (Introduced by G. F. Dick.)

*From the Section of Dermatology, Department of Medicine, University of Chicago.*

The keratinization of the epidermis is associated with considerable dehydration since the Malpighian layer contains 70% to 80% water, whereas the water content of the horny layer does not exceed 30%.<sup>1</sup> If the liberated water is lost with the insensible perspiration, conditions in which keratinization is accelerated must show increased insensible perspiration values. Earlier observations seemed to be in accord with this supposition.<sup>2,3</sup> Lately, Pinsen<sup>4</sup> found 2- to 3-fold values of insensible

perspiration in dry, scaling skin. Further experiments on this subject are reported in the present study.

**Method.** The insensible perspiration was measured by absorbing water vapor from the skin in linen bags filled with anhydrous calcium chloride. These bags were weighed, suspended under glass bells which were firmly taped to the skin, and weighed again after 60 minutes.\*

**Results.** Parallel values obtained in simul-

TABLE I.  
Insensible Perspiration in Psoriasis.  
Measurement on Adjacent Areas of Normal Skin and Psoriasis Patches.  
Diameter of glass bells 4.71 cm.

| Date     | Name  | Sex | Age | Region  | Room temp.,<br>F° | I.P. in mg     |                   | Increase of I.P.<br>in psoriasis |
|----------|-------|-----|-----|---------|-------------------|----------------|-------------------|----------------------------------|
|          |       |     |     |         |                   | Normal<br>skin | Psoriasis<br>skin |                                  |
| 11-27-43 | H.H.  | M   | 42  | Back    | —                 | 9.4            | 73.4              | 8x                               |
| 12-28    | L.    | M   | 43  | Abdomen | 75                | 23.8           | 109.1             | 4x                               |
| 2-7-44   | C.E.  | M   | 77  | Chest   | 77                | —              | 92.3              | —                                |
| 2-8      | E.M.  | M   | 56  | "       | 76                | 13.1           | 88.9              | 6x                               |
| 2-12     | E.M.  | M   | 56  | Abdomen | 74                | —              | 58.4              | —                                |
| 2-19     | D.S.  | M   | 66  | Sacrum  | 76                | 25.5           | 98.6              | 4x                               |
| 2-22     | —     | M   | —   | Back    | —                 | 18.6           | 55.5              | 3x                               |
| 3-11     | A.K.* | M   | 33  | Abdomen | 77                | —              | 97.4              | —                                |
| 3-11     | A.K.* | M   | 33  | "       | 77                | —              | 90.8              | —                                |
| 4-17     | M.R.† | F   | 40  | Thighs  | 77                | 14.7           | 56.3              | 4x                               |

\* Two adjacent areas measured in generalized psoriasis.

† Symmetrical areas measured.

<sup>1</sup> Rothman, S., and Schaaf, F., *Chemie der Haut, Jadassohn's Hand. d. Haut- u. Geschlechtskr.*, 1929, **1**, 161, J. Springer, Berlin.

<sup>2</sup> Rothman, S., *Strahlentherapie*, 1930, **35**, 381.

<sup>3</sup> Rothman, S., *Zentralbl. f. Haut- u. Geschlecht-*

*skr.*, 1931, **37**, 30.

<sup>4</sup> Pinsen, E. A., *Am. J. Physiol.*, 1942, **137**, 492.

\* A detailed description of the method is given in Felsher, Z., *Hereditary Ectodermal Dysplasia*, *Arch. of Derm. and Syphil.*, in press.

TABLE II.

Insensible Perspiration in Exfoliative Dermatitis.  
36-year-old white male suffering from generalized exfoliative dermatitis following arsphenamine medication. All measurements were made on abdomen.

| Date     | I.P. values in mg |       | Remarks                                 |
|----------|-------------------|-------|-----------------------------------------|
|          | Right             | Left  |                                         |
| 12- 6-43 | 216.5             | —     | Abundant lamellous scaling.             |
| 12- 7    | 222.5             | 229.2 | Same.                                   |
| 12-24    | 60.5              | 68.7  | Scaling greatly diminished.             |
| 1-20-44  | 21.3              | 19.7  | Skin completely cleared up. No scaling. |

TABLE III.

Insensible Perspiration in Ichthyosis Vulgaris.

| Date     | Name | Sex | Age | Region                         | I.P. in mg   | Room temp.,<br>F° | Remarks                           |
|----------|------|-----|-----|--------------------------------|--------------|-------------------|-----------------------------------|
| 12-19-43 | A.T. | F   | 51  | Rt. thigh<br>Rt. poplit. fossa | 23.3<br>24.8 | 77                | Popliteal area free of ichthyosis |
| 1-20-44  | A.L. | F   | 34  | Left thigh<br>Left leg         | 29.6<br>27.0 | —                 | Adjacent ichthyotic areas         |
| 2- 7     | M.S. | F   | 13  | Rt. thigh<br>Left thigh        | 34.4<br>34.2 | 77                | Symmetrical ichthyotic areas      |

TABLE IV.

Insensible Perspiration in Ultraviolet Erythema.

| Date    | Name | Sex | Age | Region  | I.P. in mg  |             | Room temp.,<br>F° | Remarks                                                                           |
|---------|------|-----|-----|---------|-------------|-------------|-------------------|-----------------------------------------------------------------------------------|
|         |      |     |     |         | Normal skin | Eryth. skin |                   |                                                                                   |
| 3- 1-44 | M.M. | F   | 19  | Abdomen | 13.8        | 17.9        | —                 | Mild erythema. Increase of I.P. in erythematous area 30%. Symmetrical areas used. |
| 3- 7    | M.M. | F   | 19  | "       | 20.9        | 28.9        | —                 | Vivid erythema. Increase 38%. Symmetrical areas.                                  |
| 3- 8    | S.R. | M   | 50  | Thighs  | 24.2        | 33.8        | 78                | Mild erythema. Increase 40%. Symmetrical areas.                                   |
| 4-21    | S.R. | M   | 50  | Abdomen | 12.8        | 16.4        | 75                | Increase 20%. Temp. of erythematous area 0.8°C higher than that of normal skin.   |

taneous measurements of symmetrical or adjacent normal skin areas in the same person were equal within 10% in five experiments. Measurements over *psoriasis* patches with hyperproduction of keratin showed an increase of 3 to 8 times the values of normal adjacent areas (Table I). In *exfoliative dermatitis* with greatly accelerated keratinization a 10-fold increase was obtained at the height of the eruption, and gradual decrease to normal values on recovery (Table II). In *ichthyosis vulgaris* the thickening of the horny layer is

not associated with increased proliferation of the Malpighian layer, and the hyperkeratosis seems to be due merely to a disturbance in the separation of the scales. Table III shows practically no or very slight increase of insensible perspiration in this disease.

In *psoriasis* and *exfoliative dermatitis* increased keratinization is associated with arterial hyperemia. However, experiments on ultra-violet erythema reveal that arterial hyperemia in itself, without increase of keratin formation, causes only a slight increase in

TABLE V.  
Insensible Perspiration in Post-inflammatory Scaling.

| Date    | Name | Age | Sex | Region  | I.P. in mg  |              | Room temp., F° | Increase in scaling area | Remarks                                                                                                              |
|---------|------|-----|-----|---------|-------------|--------------|----------------|--------------------------|----------------------------------------------------------------------------------------------------------------------|
|         |      |     |     |         | Normal area | Scaling area |                |                          |                                                                                                                      |
| 3-10-44 | M.M. | 19  | F   | Abdomen | 19.5        | 44.8         | 77             | 2.3x                     | Measured 4 days after U.V.L. irradiation. No erythema. Moderate fine scaling.                                        |
| 4-31    | S.R. | 50  | M   | "       | 19.0        | 42.1         | 71             | 2.2x                     | Measured 9 days after U.V.L. irradiation. Lamellous scaling. Skin temp. of scaling area same as that of normal area. |

insensible perspiration (Table IV). A marked increase is noted after the onset of scaling when the inflammation has subsided (Table V).

**Conclusions.** Hyperproduction of keratin in the epidermis causes an increase of insensi-

ble perspiration. It seems probable that physiologically, too, one part of the insensible perspiration is contributed by the keratinization process in consequence to the dehydration of Malpighian cells.

## 14625

### Germicidal Potency and Tissue Toxicity of Surface Active Saline Mixture of Azochloramid.

A. J. SALLE.

*From the Department of Bacteriology, University of California, Los Angeles.*

In previous communications<sup>1,2</sup> results were reported on the germicidal efficiency of the organic chlorine compound Azochloramid. The germicide was tested for its effect on living embryonic chick heart tissue fragments cultivated *in vitro* as well as for its ability to kill the test organisms *Staphylococcus aureus* and *Eberthella typhosa*. The tissue fragments and bacteria were exposed separately to the germicidal dilutions for 10 minutes at 37°C in the presence of a standard amount of organic matter. The organic matter was composed

of a mixture of 3 parts embryonic extract and 1 part horse serum. A number known as the toxicity index was calculated which was defined as the highest dilution of germicide required to kill the tissue cells in 10 minutes to the highest dilution required to kill the test organisms in the same period of time under identical conditions. Theoretically, an index less than 1 means that the germicide is more toxic to the bacteria than to the embryonic chick heart tissue fragments; an index greater than 1 means that the germicide is more toxic to the tissue cells than to the bacteria.

Recently Azochloramid has been improved by the addition of sodium tetradecyl sulfate, a negatively charged (anionic) surface active or wetting agent. Chemically it is the sodium

<sup>1</sup> Salle, A. J., McOmie, W. A., Sheehmeister, I. L., and Foord, D. C., *J. Bact.*, 1939, **37**, 639.

<sup>2</sup> Salle, A. J., Sheehmeister, I. L., and McOmie, W. A., *Proc. Soc. Exp. Biol. and Med.*, 1940, **45**, 614.