as measured with the Falk capillary cell. As Table I will show, the addition of the salts to the growth medium had little or no effect on the cataphoretic velocity which measures the zeta potential. In a future paper (Pedlow and Lisse) it will be shown that the zeta potential of the bacteria in aqueous suspension can be changed when salts are added to the growth medium in greater concentrations.

It was also shown that no change of the electrophoretic velocity of organisms (once washed) greater than 2.5% was produced by adjusting the initial pH of the medium to values over the range 6.8 ± 1.9, the pH after growth having a value 6.5 to 8.6, 5.7 to 8.6, and 6.1 to 8.6 for the upper half, lower half and the whole agar.

8182 C

Amino Acids in Human Skin.*

H. C. ECKSTEIN.

From the Department of Physiological Chemistry, Medical School, University of Michigan, Ann Arbor.

The outer layers of human skin were successively extracted in the cold with 95% alcohol, ethyl ether and chloroform. The material was then digested with commercial pepsin for 72 hours and for a similar length of time with commercial trypsin. The residual dry product contained 6.1% of ash and 14.2% of total nitrogen. Some of it was analyzed by means of the Van Slyke partition method. Cystine was determined according to Folin and Marenzi and tyrosine and tryptophane by the Folin and Ciocalteu procedure. The values for the basic amino acids (Van Slyke method) were recalculated and are shown in the table in terms of per cent in the residual skin. This was done in order that a comparison could be made with the results obtained by Wilkerson,[1] who recently reported on the chemical nature of human skin. Wilkerson used a modification of the Vickery and Leavenworth method for the basic amino acids, but the remainder of his data were obtained by the same procedures employed by the writer. The values shown in Table I are those obtained by the writer as well as those pub-

* This material was made available through the courtesy of Professor Udo J. Wile of the Department of Dermatology and Syphilology, Medical School, University of Michigan, Ann Arbor.

[1] Wilkerson, V. A., *J. Biol. Chem.*, 1934, **107**, 377.

TABLE I.

	Eckstein %	Wilkerson[1] %	Block[2] %
Humin N	2.02	2.11	—
Amide N	7.68	3.60	—
Arginine	5.91	10.01	6.00
Lysine	4.68	3.06	4.50
Histidine	0.64	0.59	0.82
Cystine	3.82	2.31	3.40
Tyrosine	3.42	5.70	—
Tryptophane	1.80	1.49	—

lished by Wilkerson. Those given for human nitrogen and amide nitrogen are expressed in terms of total nitrogen while the ones shown for the amino acids are given in terms of the residual tissue. It is clear from the tabulations that a considerable difference exists between the two sets of data. This may be due to the fact that whereas the author analyzed skin that had been digested with proteolytic enzymes, Wilkerson merely examined partially defatted skin. On the other hand, Block[2] who digested skin with pepsin found 6.0% of arginine, 4.5% of lysine, and 0.82% of histidine in his dry digested material. Block's results are in accordance with the writer's. Block also used a modification of the Vickery and Leavenworth method.

8183 C

Basic Amino Acids of Human Skin.*

RICHARD J. BLOCK.†

From the Biochemical Laboratory of the Connecticut Agricultural Experiment Station and the Department of Physiological Chemistry, Yale University, New Haven.

The older definition of keratin based on the physical properties and behavior towards the common proteolytic enzymes of the tissue proteins has been modified by Block and Vickery.[1] They define keratin as "a protein which is resistant to digestion by pepsin and

2 Block, R. J., PROC. SOC. EXP. BIOL. AND MED., 1935, **32**, 1574.

* The expenses of this investigation were shared by the Connecticut Agricultural Experiment Station and by the Carnegie Institution of Washington, D. C.

† The data in this paper are taken from the dissertation submitted by R. J. Block in partial fulfillment of the requirement for the degree of Doctor of Philosophy, Yale University, 1931.

1 Block, R. J., and Vickery, H. B., *J. Biol. Chem.*, 1931, **93**, 113.