around the medial part of the internal lamina medullaris.[5] Electric stimulation of this region in experimental animals yields a spike and dome pattern in the electroencephalogram (Jasper[6]). Preceding this lesion, the electrothalamogram was recorded simultaneously with the electroencephalogram;[7] spike discharges were found in the electrothalamogram.† These spike discharges were not limited to the immediate vicinity of the internal lamina medullaris but sometimes showed the maximum in more dorsal parts of the thalamus close to the ventricle (Fig. 1). In two cases, the operation did not influence the grand mal attacks; it diminished, at least transitorily, the frequency of the petit mal attacks and the severity of accompanying motor phenomena.

Summary. The stereotaxic technique has been applied to the human brain for relief of mental disorders with a prevalent emotional component and of intractable pain. In epileptics suffering from grand and petit mal, the electrothalamogram was recorded, revealing spike discharges; lesions placed in the vicinity of the commissura media diminished frequency and severity of the petit mal attacks.

5 Spiegel, E. A., Wycis, H. T., Freed, H., and Lee, A. J., Am. Neurol. Assn., June 16, 1948.

6 Jasper, H. H., and Droogleever-Fortuyn, J., *Res. Publ. Assn. Nerv. Ment. Dis.*, 1947, **26**, 272.

7 Wycis, H. T., Spiegel, E. A., and Lee, A. J., Intl. League against Epilepsy, Am. Branch, June 13, 1948.

† Gibbs, Hayne and Gibbs[8] also recorded spike discharges from various subcortical areas in petit mal. The authors inserted the recording electrode into the brain of the patients without the guidance of a stereotaxic apparatus, trying to establish the location by x-ray studies after air injections into the ventricles.

8 Gibbs, F. A., Hayne, R., and Gibbs, E. L., Int. League against Epilepsy, Am. Branch, June 13, 1948.

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Possible Role of Free Phenols in Renal Uremia.*

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The work of Becher and his associates,[1-6] has stressed the importance of free phenols in blood as a major factor in the development and intensification of the uremic syndrome. In an extensive review of the pathogenesis of this syndrome, Harrison and Mason[7] state that "whether in patients with nephritis phenol retention is sufficiently marked to produce further renal damage is an interesting but still unsettled problem." Dickes,[8] using the method of Theis and Benedict[9] for determining blood phenols, noted that 21 out of 23 uremic patients showed a direct correlation between the degree of cerebral depression and the height of the blood phenols. However, the correlation of total phenols was

* Data from thesis submitted in partial fulfillment of the requirements for the Degree Master of Science.

1 Becher, E., *Deut. Arch. f. Klin. Med.*, 1925, **145**, 333.

2 Becher, E., *Ergeb. d. ges. Med.*, 1933, **18**, 51.

3 Becher, E., and Koch, F., *Deut. Arch. f. Klin. Med.*, 1925, **148**, 78.

4 Becher, E., and Litzner, S., *Klin. Wochschr.*, 1926, **5**, 147.

5 Becher, E., and Litzner, S., *Klin. Wochschr.*, 1926, **5**, 1373. Cited *Chem. Ab.*, 1926, **20**, 3192.

6 Becher, E., Litzner, S., and Taglich, W., *Z. f. Klin. Med.*, 1926, **104**, 182.

7 Harrison, T. R., and Mason, M., *Medicine*, 1937, **16**, 1.

8 Dickes, R., *Arch. Int. Med.*, 1942, **21**, 662.

9 Theis, R. C., and Benedict, S. R., *J. Biol. Chem.*, 1924, **61**, 67.

TABLE I.
Blood Phenol Determinations—Method of Schmidt.
Diagnosis: Uremia of Renal Origin.

Case No.	N.P.N. mg %	Free phenol mg %	Conjugated phenol mg %	Total phenol (Free plus conjugated) mg %
1	105	.050	.519	.569
2	210	.164	—	—
3	—	.098	1.477	1.575
4	50	.077	.526	.603
5	59	.074	—	—
6	—	.077	.371	.448
7	92	.081	.145	.226
8	50	.099	—	—
9	51	.580	.229	.809
10	88	.089	.846	.935
11	189	.102	.878	.980
12	78	.051	.052	.103
13	54	.135	.425	.560
14	55	.073	.110	.183

better than that of the free or conjugated phenols. Roen,[10] using the Millon reagent, reported an elevation of blood phenols in all cases of uremia regardless of the type of renal failure. Although the height of the blood phenols was generally related to the uremic syndrome, it was not in direct proportion to the uremic state.

A review of the literature concerning the methods for determining blood and urine phenols by Deichmann and Schafer[11] and Volterra[12] showed that there were very few, if any, methods available that were specific, or nearly so, for determination of the phenols in blood and urine. The methods used by Dickes[9] and Roen[10] and earlier by Becher *et al.*,[13] because of the technic used or the non-specificity of the colorimetric reagent, gave phenol values which were high for human blood, if compared with values obtained by Deichmann and Schafer[11] or with those obtained by the method of Schmidt[14] which eliminates most non-phenolic substances that would affect the final colorimetric reading.

The method of Schmidt[14] for determining blood phenols was critically evaluated by the author. Phenol recovery experiments were run on both beef and human blood. Average recovery of free phenol from beef blood was 77% and from human blood, 68%. Determinations were made on 14 normal human blood samples to obtain a point of reference in evaluating data obtained from bloods of uremic patients. Free and conjugated phenols in blood samples from patients diagnosed as having or developing the uremic syndrome from renal disfunction were determined. The results for free, conjugated and total phenols and those for non-protein nitrogen are shown in Table I.

Each clinical case, except No. 9, shows the free phenol value to be within a normal range (.051 to .088 mg %) as determined on the above mentioned series of normal adult blood. (Schmidt[14] presented "normal" free phenol values for pooled human blood ranging between .011 and .041 mg %). Case No. 9 died 8 hours after the blood sample was taken for analysis. At this late stage of the syndrome the conjugating mechanism was undoubtedly failing rapidly, possibly accounting for the increased free phenol value.† It is important to note that, according to the

[10] Roen, P. R., *J. Urol.*, 1944, **51**, 110.

[11] Deichmann, W. B., and Schafer, L. J., *Am. J. Clin. Path.*, 1942, **12**, 129.

[12] Volterra, M., *Am. J. Clin. Path.*, 1942, **12**, 525.

[13] Becher, E., Litzner, S., and Taglich, W., *Munchen. Med. Wochschr.*, 1925, **76**, 1676.

[14] Schmidt, E. G., *J. Biol. Chem.*, 1943, **150**, 69.

[15] Nesbit, R. M., Burk, L. B., and Olsen, N. S., *Arch. Surg.*, 1946, **53**, 483.

† P.M. findings: Liver: Chronic passive congestion. Kidney: Degenerated and resembling bichloride of mercury poisoning.

free phenol values, not at any time is there present enough free phenol in the blood to produce the symptomatic picture of phenol poisoning or the uremic syndrome. This is contrary to the evidence of Becher[1] and Becher and Koch.[3] The present author, with Becher and Litzner,[4] Becher *et al.*,[13] Dickes,[8] Roen[10] and Nesbit *et al.*,[15] finds that the conjugated and hence the total phenols increase in the uremic syndrome, although the values given in this report are much lower than those of these authors.

Summary. In 14 clinical cases involving uremic syndrome herein reported upon, it was found that:

a) The free phenols had little if any effect in producing or intensifying the uremic syndrome. b) During the uremic syndrome the free, conjugated and total phenols did increase, but not significantly enough to warrant their consideration as an important factor in the uremic syndrome. The methods employed in previous reports give reason to doubt the validity of conclusions drawn concerning the relationship of free, conjugated and total phenols to the uremic syndrome.

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Fluorimetric and Biological Determination of Estrogens in the Eggs of the American Lobster (*Homarus americanus*).*†

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The presence of hormones in the tissues and body humors of a variety of invertebrates, both marine and terrestrial, appears to be well-established.[1] Among these, substances having estrogenic potencies are not uncommon.[2] However, satisfactory procedures for producing extracts free of contamination and for testing the potency of such extracts by fluorimetric, as well as the usual biological technics, have only recently become available. This study was made to determine the estrogenic potencies of the eggs of a representative marine invertebrate—the American lobster.

Materials and Methods. A total of 395 g (wet weight), about a quarter of a million eggs, were used, the total yield of 9 specimens. All the eggs were recently spawned and attached to the caudal appendage. The eggs of the lobster remain within the body cavity for nearly a year following ovulation so that the eggs used in this study were all about 11 months old. The extraction procedure follows: The eggs are thoroughly macerated in a Waring Blendor in twice their volume of 95% ethyl alcohol and allowed to stand for 24 hours. The alcohol is filtered off and the residue re-extracted with alcohol for 24 hours. The alcoholic extracts are combined and shaken thoroughly for a half hour with an equal volume of petroleum ether. The ether fraction is removed and the alcoholic fraction is again shaken with ether. Following this, the alcoholic fractions are combined and evaporated to dryness and the deep orange residue is taken up in toluene as a supersaturated solution. For purposes of further purification preceding fluorimetric and biological analysis 5 cc samples were taken of the toluene concentrate. Five cc of the toluene solution are shaken with 10 cc 1N NaOH

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1 Hanström, B., *Hormones in Invertebrates.* Oxford Press, 1939, Chap. 2, p. 22.

2 Donahue, J. K., *Endocrinology,* 1940, **27**, 149.