recover when replaced in water, they consider the condition as one of anesthesia. By plotting the effects of various concentrations on X axis, and the reciprocal of the time on the Y axis, they get the formula:

$$A = \sqrt{\frac{\tan.\theta}{\alpha}}$$

which corresponds to the strength of the anesthetic.

A = anesthetic effect.

α = the subliminal concentrations of the drug.

θ = the angle formed with the axis X by protecting to the X axis the straight line formed by the points of different concentrations.

We were interested in comparing the results of the various methods, and in comparing procaine and some other related synthetic preparations with cocaine. The results are interesting:

FOR PROCAINE IN TERMS OF COCAINE.

Rabbit's eye.	Frog's sciatic.	Pittenger's method.	Türck method.
$^3/_{16}$	$^1/_6$	$^1/_{11}$	0

The results show that when, as the result of a biological method, we state that a drug is equivalent to a certain concentration of cocaine, it is important to state the method used. The cocaine equivalent differs apparently for both method and location.

DISCUSSION.

E. L. NEWCOMB inquired if the work had been done entirely with 100% pure anesthetic or if any comparative work had been done with crude drugs containing these anesthetics.

DR. MCGUIGAN replied that the work had been entirely with the pure anesthetic.

THE EFFECT OF INJECTION, INTO RATS, OF IMPROPERLY ALKALINIZED SOLUTIONS OF SALVARSAN.*

BY H. B. CORBITT AND C. N. MYERS.

The object of this demonstration was to show the effect of adding sufficient and insufficient amounts of alkali in the alkalinization of a solution of salvarsan or other arsphenamines. Three rats were injected with 200 mg. per Kg. of salvarsan, according to the official procedure, as follows, with the results indicated.

Rat No. 1 received the unalkalinized salvarsan solution (salvarsan hydrochloride in 2 per cent. dilution). This animal died on the board.

Rat No. 2 received a partially alkalinized salvarsan solution (sufficient alkali to form, theoretically, the mono-sodium salt in solution). This animal died within fifteen minutes.

Rat No. 3 received a completely alkalinized salvarsan solution (sufficient alkali to form, theoretically, the di-sodium salt in solution). This animal lived to be chloroformed at the end of the demonstration.

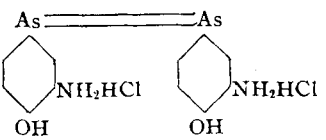
* Demonstration at the "Stunt Show" of the Scientific Section, A. PH. A., Asheville meeting, 1923.

One of us (M.) has shown elsewhere that protein-salvarsan compounds are formed in the blood upon the injection of salvarsan or other arsphenamines. The size and solubility of these aggregates are directly related to the hydrogen-ion concentration of the salvarsan solution. An acid solution results in the formation of large insoluble particles, whereas in an alkaline solution, the state of dispersion is such that the particles readily pass through the capillaries and are eventually absorbed. The above experiment showed clearly the relative toxicity of acid, mono-sodium, and di-sodium salt solutions at this concentration (2 per cent. solution).

The accompanying chart shows the theoretical chemical transformation of Salvarsan on the addition of given amounts of sodium hydroxide.

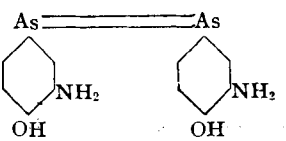
CHART SHOWING THEORETICAL CHEMICAL TRANSFORMATION OF SALVARSAN INTO THE DI-SODIUM SALT REQUIRED FOR INTRAVENOUS INJECTION.

I—Salvarsan.



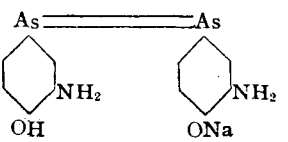
Salvarsan as it appears on market.

II—Salvarsan Base.

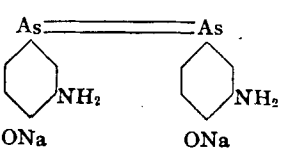


Sodium Chloride NaCl is formed at this stage of alkalinization.

III—Mono-sodium Salt of Salvarsan.



IV—Di-sodium Salt of Salvarsan.



I.

Salvarsan di-hydrochloride.
Yellow powder about 31.50 per cent. arsenic.
Soluble in cold water.
Acid to litmus.
Solution not suitable for intravenous administration.

II.

Salvarsan base.
Precipitated upon addition of 12 drops of 15 per cent. sodium hydroxide solution or 2.52 cc. of normal sodium hydroxide solution per 0.6 gram salvarsan. Insoluble yellow precipitate. Causes reactions.
Not suitable for intravenous administration.

III.

Mono-sodium salt of salvarsan.
Formed upon addition of 18 drops of 15 per cent. sodium hydroxide solution or 3.78 cc. normal sodium hydroxide solution. Just soluble in water. Clear yellow solution. Slightly alkaline to litmus. *Not* suitable for intravenous administration.

IV.

Di-sodium salt of salvarsan. Formed upon addition of 24 drops of 15 per cent. sodium hydroxide solution of 5.04 cc. normal sodium hydroxide solution. Completely soluble in water. Clear yellow solution. Ready for intravenous administration, in dilution of 0.1 gram in 30 cc. of freshly distilled water. This is the *only* form in which salvarsan or other arsphenamines should be used.

RESEARCH DIVISION,
H. A. METZ LABORATORIES,
NEW YORK CITY.