where T is the total exchange capacity of the adsorbent.

By experimentally determining X at any two values of K^+(ad) it is possible to solve equation 3 for $k_{\rm RH}$ and C.

From the experimental data obtained with the synthetic resin "Ion X," $k_{\rm RH}$ and C have been calculated to be 0.82 and 11.0 respectively. It has been found that these values are unaffected by variations in the amount of potassium adsorbed or the amount of HCl in the system. It may be stated that $k_{\rm RH}$ has the dimensions of concentration and is therefore dependent on the mass of the sample used. The value 0.82 is on the basis of meq. per gr of adsorbent.

When the value calculated for C, 11.0, is taken as a measure of the adsorption energy of electrovalently bound hydrogen, the element assumes a position which is much more reasonable with respect to other monovalent ions. This will be clear from the corresponding constants for alkali metal ions. Adsorption energies of alkali metal ions and electrovalently bound hydrogen ions on the synthetic resin "Ion X" are set out below for comparison:

H	0.09
Li	0.55
Na	0.74
NH	0.95
K	1.00
Rb	1.22
Cs	1.70

Similar calculations for other exchange materials are being carried out and will be reported elsewhere.

Location of the Syncline in Island Arc Structure

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The tectogene hypothesis of syncline development is one of the more promising contributions to modern stratigraphy. By it we are given a cause, a mode of operation, a set of mechanical principles, a schedule of events, and a more-or-less predictable synclinal pattern. It is tacitly, if not expressly, assumed that the foredeep is the geosynclinal structure in which sediments are accumulated, to be lithified and preserved through future ages. This, however, raises certain difficulties.

In the first place, modern foredeeps include some which have been filled; some, partly filled; and some in which, apparently, little sedimentation has taken place. This third case includes those island arc troughs which now have ocean-water depths measurable in thousands or even tens of thousands of feet. These are true ocean deeps, and when sediments accumulate here to any great thickness, they will be of the deep-ocean type.

It would seem that some of the troughs of the past would have been slow in filling, also; and that, if we accept the identity of the foredeep with the geosynclinal structure, we should find, basal in at least a few such cases, true deep-sea deposits. No such find has ever been reported.

In the second place, the island arc pattern, as developed in modern seas, is sharply defined and distinctive. If the foredeep is also the geosynclinal structure, synclinal sediments of the Paleozoic, for instance, should exhibit such a pattern.

In the third place, sediments of many of the best-known synclines of the past were derived from land masses located seaward. If the foredeep is the geosynclinal structure, however, modern island arc arrangement practically excludes the possibility of a sourceland on the convex rim of the trough.

The island arc proper is the only significant source of sediments until a much later time in the history of the area. While the deep is still present, sediments can move in only two general directions: (1) from the islands, toward the concave rim of the trough, and hence toward (but not to) the main ocean basin; and (2) from the islands, toward the continent, and hence into the *becken* which lies inside the arc.

This *becken* (or *meeresbecken*), being located distinctly on the shelf, can receive only shallow-water sediments. Its pattern and size are only slightly affected by the pattern and size of the island arc. And much of its sedimentary load can be derived from seaward: first from the islands of the arc, and later from the upbuoyed tectogene.

It is not suggested that no true foredeep sediments will ever be found. It is suggested that the shallow *becken*, rather than the deep trough, may have been the geosynclines of the past.

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A Rapid Method for Obtaining Clear Soil Extracts

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Barium sulfate is widely used for flocculation of suspended matter in soil extracts, mainly because it eliminates most of the equipment necessary for filter paper procedure, it saves time, and because of its inert characteristics it does not interfere with the ionic concentration of the soil solution. The phenomenon is purely physical, in that the finely divided white powder carries a charge which causes the oppositely charged particles to flocculate and then settle to the bottom of the tube by the action of gravity.

This process, however, is not entirely complete, as a small amount of the powder remains suspended. For this reason alone, a simple and useful method to obtain clear soil extracts is rendered useless when testing for potassium, sulfates, calcium, and chlorides by the customary method, because of interference by the suspended barium sulfate powder. Thus, a quantitative analysis for these ions is out of the question.

Finely divided wood charcoal has been commonly used for clarification purposes, and was found to function in precisely the same manner when mixed with barium sulfate in the proportion of one part powdered charcoal (various brands gave equally good results) to four parts of barium sulfate. The charcoal apparently collected the small amount of remaining barium sulfate by adsorption and settled out in a dark layer at the top of the soil column, leaving a clear aqueous solution which could be readily drawn off with a pipette for analysis.

It was further found that the use of the popular sodium acetate-acetic acid extracting solution used in soil testing tended to enhance this settling process rather than hinder it, since clear extracts were obtained 5–10 min sooner than with distilled water alone.

A series of tests were carried out, using 0.1*N* acetic acid buffered to pH 5.5 with sodium acetate. No change was noticed in the ionic concentration of the extract when compared with an extract not using wood charcoal powder. Good results were obtained with various types of soils, including those with high clay content.

The general procedure for conducting a barium sulfate-charcoal extraction is relatively simple: One level teaspoon of soil is put in a 15 cm × 15 mm test tube; one-fourth teaspoon of a 4: 1 barium sulfate-charcoal mixture is added, and then 10 ml of the extracting solution. The proportion of soil to water is now approximately 1: 6. The test tube is stoppered and shaken for 1 min. The tube is then placed in an upright position for 20 min to clarify. With a pipette, as much of the clear extract is carefully drawn out as is needed to deliver aliquot portions to a series of tubes set up for various soil tests. The only alteration of the procedure is in the colorimetric determination of pH, wherein distilled water is substituted for the extracting solution.

Crystalline Dihydrostreptomycin Base

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Dihydrostreptomycin (*1*) has been crystallized both as the sulfate (*2*) and as the hydrochloride (*3*). We wish to report also the preparation of crystalline dihydrostreptomycin-free base. Crystals of the base were obtained by converting relatively pure dihydrostreptomycin sulfate essentially to the free base, either by titration of a water solution to about pH 12 with barium hydroxide or by passing an aqueous solution over a strongly basic ion-exchange resin in the hydroxyl cycle—for example, Amberlite IRA-400 (The Resinous Products Division of Rohm and Haas Company). The free base was then precipitated from the aqueous solution with a water-miscible solvent such as acetone. The precipitation was in the form of an oil which gradually crystallized as needlelike crystals with some tendency to cluster in rosettes.

The crystallinity of this material was established both by microscopic examination and by x-ray pattern study. The x-ray powder diffraction data (see Table 1) were obtained on a Norelco diffraction camera of 114-mm radius using nickel-filter copper-Kα radiation ($\lambda = 1.5347$ A).

TABLE 1

X-RAY DIFFRACTION DATA OF DIHYDROSTREPTOMYCIN BASE

"D" values*	Relative intensities
15.6	0.25
10.5	1.00
9.53	0.63
6.28	0.13
6.11	0.13
5.76	0.25
5.40	0.13
4.98	0.25
4.67	0.38
4.32	0.38
4.02	0.06
3.86	0.13
3.35	0.13
3.26	0.13

* Interplanar spacing.

The biological potency of crystalline dihydrostreptomycin base against *E. coli* by the Food and Drug Administration turbidimetric test was somewhat low, being only 922 μg/mg (average 6 days' test). This crystalline base has no mp up to 300° C; it charred at 240° C turning black up to 300° C; it was reconstituted as a 1% water solution, giving a pH of 12. *Analysis.* Calculated for $C_{21}H_{41}O_{12}N_7 \cdot H_2O$: C, 41.93; H, 7.20; N, 16.30. Found: C, 41.73; H, 7.32; N, 16.35; SO_4, 0; Cl, 0.

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[1] The authors wish to thank Miss Margaret Carter and Mrs. Ruth St. John for their technical assistance.