

others cause a decrease, followed by an increase, of permeability. In a properly balanced solution the permeability remains normal. Cell walls may be semipermeable to an extent which renders them important in such experiments.

Point Sets and Cremona Groups. Part III.: Arthur A. Coble, Department of Mathematics, Johns Hopkins University. The group $G_{3,2}^2$ is used in the problem of determining the lines of a cubic surface. The determination differs from that of Klein.

The Interferences of Spectra both reversed and inverted: Carl Barus, Department of Physics, Brown University.

Sex Intergrades in a Species of Crustacea: Arthur M. Banta, Station for Experimental Evolution, Carnegie Institution of Washington. The author has collected a large amount of data on several species of Cladocera which is interesting because of the remarkable array of sex forms, the stock in general consisting of perhaps 40 per cent. normal males and about 8 per cent. normal females, the remainder being intergrades with almost every combination of sex characters.

Some Problems of Diophantine Approximation a Remarkable Trigonometrical Series: G. H. Hardy and J. E. Littlewood, Trinity College, Cambridge, England. A series is given which is never convergent or summable for any value of θ , and is accordingly not a Fourier's series. And further a function is found which does not possess a finite differential coefficient for any value of θ .

Steric Hindrance and the Existence of Odd Molecules (Free Radicals): Gilbert N. Lewis, Chemical Laboratory, University of California. It is contended that the hypothesis underlying the somewhat elusive phrase "steric hindrance" should not be introduced until phenomena are known which can not be so well explained in other ways. It is shown how the so-called free radical of organic chemistry may be explained independently of the hypothesis of steric hindrance.

Newton's Method in General Analysis: Albert A. Bennett, Department of Mathematics, Princeton University. An extension

to general analyses of special algebraic work of H. B. Fine.

The Cobaltamines: William D. Harkins, R. E. Hall and W. A. Roberts, Kent Chemical Laboratory, University of Chicago. The authors have determined accurately the freezing-point lowerings caused by eight different cobaltamine salts, and have derived from the results the number of ions into which each salt dissociates. These are found to be in accordance with Werner's theory.

National Research Council: Report of the First Meeting of the Council. Reports of meetings of the Executive Committee. Organization of the Research Council (as at present constituted).

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THE AURIFEROUS GRAVELS OF THE SIERRA NEVADA

THE origin and the natural distribution of the \$300,000,000 of gold that has been mined from the Tertiary placer gravels of the Sierra Nevada of California is the subject of a report by Waldemar Lindgren, which has been published by the United States Geological Survey as Professional Paper 73.

The Geological Survey's studies of the Tertiary placer deposits of the California Sierra began in 1886 and were concluded about 15 years later. During this period 22 quadrangular areas were topographically mapped and 14 of these were studied in geologic detail and the results published by the survey in geologic folios. Professional Paper 73 includes the salient features of this earlier work, most of which was done by Mr. Lindgren himself. This report, thus comprehensive in geographic scope and minute in geologic detail, is believed to be the most complete and thorough description of a great placer-gold province ever published.

In the main the report is a detailed description of the entire area covered, including the gold placer gravels, but Mr. Lindgren's general account of the tremendous earth forces that built up the Sierra and of the processes

that freed the gold from its mother rock and brought about its concentration in prehistoric river channels forms altogether a most impressive description of continent building. Looking backward through inconceivably long vistas of time in which periods covering millions of years supplant the centuries by which we now compute its passage, the geologist pictures the uplift of the new-born mountain range by upward-forced great bodies of molten granite. This uplift was accompanied or closely followed by the formation of veins and seams of gold-bearing quartz, and the resulting highland was then planed down by erosion caused by rainfall and the action of streams of water.

Tracing the long course of this early history the geologist now finds that toward the end of what is known as Tertiary time—a comparatively recent geologic period—volcanic forces that had long been quiescent vigorously reasserted themselves. Flows of rhyolite, a volcanic rock, pouring from many craters, filled valleys that were covered with gold-bearing gravel, deeply burying the gold and causing the formation of new stream courses.

The geologic events thus outlined long preceded the period of human history in which these metal deposits were mined. In 1849 an army of gold seekers invaded the Sierra. They worked first along the present streams, but gradually the metal was traced to the old Tertiary river beds on the summits of the ridges and to the quartz veins, the primary source of all the gold in the Sierra Nevada. Millions of dollars in gold were produced annually up to the seventies of the last century, but the gold-mining industry has slowly diminished, until now less than \$1,000,000 is produced annually, the decline being due to the prohibition of hydraulic mining and the exhaustion of the richer channels suitable for drift mining.

The total output of gold in California is estimated at \$1,200,000,000 to \$1,500,000,000, about one fifth of which has been derived from quartz veins, \$300,000,000 from the Tertiary gravels, and the remainder from the Quaternary deposits.

SPECIAL ARTICLES
ON THE DIFFERENTIAL EFFECT OF CERTAIN
CALCIUM SALTS UPON THE RATE OF
GROWTH OF THE TWO SEXES OF
THE DOMESTIC FOWL¹

IN connection with an extensive series of experiments on the effect of feeding various organ substances to growing chicks, which I have been carrying out during the past summer with the aid of Mr. W. T. Pettey, two groups were given small daily doses (Ca. 0.1 gm. to 0.3 gm.) of calcium lactate ($\text{Ca}(\text{C}_6\text{H}_5\text{O}_5)_2 + 5\text{H}_2\text{O}$) and calcium lactophosphate (a mixture of calcium lactate and calcium phosphate containing about 3 per cent. of the latter), respectively. The results were consistent, striking, and in certain particulars entirely new. A complete account of them, with detailed figures, will be published as soon as the material can be prepared for the press. In the meantime I wish to call attention, in a very brief way, to the essential features of the results. The most significant finding is that while neither of these calcium salts affects in any way, in the dosage used, the rate or amount of growth in the male chicks, both of them, but particularly the lactophosphate, induce a very marked increase in the absolute amount of growth and a corresponding acceleration in its rate in the female chicks. The dosage was begun when the birds were 29 days of age and continued until they were 171 days old, after which age there is comparatively little additional growth in the domestic fowl. At the end of this 142-day period the lactophosphate females had grown so much faster than the control females that there had been eliminated 58.4 per cent. of the normal difference between the sexes in respect to body weight (secondary sexual character). In spite of the rather large probable errors the absolute differences are statistically significant. Thus we have at 171 days of age:

Lactophosphate ♀♀ mean wt.—Control ♀♀ mean wt.
= 354.6 ± 91.9 gm.

The difference is 3.85 times its probable error.

The reproductive organs of the females were stimulated as well as growth. The rate of

¹Papers from the Biological Laboratory of the Maine Agricultural Experiment Station, No. 104.