

Scientific American.

ESTABLISHED 1846.

MUNN & CO., Editors and Proprietors.

PUBLISHED WEEKLY AT NO. 87 PARK ROW, NEW YORK.

O. D. MUNN. A. E. BEACH.

TERMS FOR THE SCIENTIFIC AMERICAN.

One copy, one year, postage included. \$3 20

One copy, six months, postage included. 1 60

Club Rates.

Ten copies, one year, each \$2 70, postage included. \$27 00

Over ten copies, same rate each, postage included. 2 70

The postage is payable in advance by the publishers, and the subscriber then receives the paper free of charge.

NOTE.—Persons subscribing will please to give their full names, and Post Office and State address, plainly written. In case of changing residence state former address, as well as give the new one. No changes can be made unless the former address is given.

Scientific American Supplement.

A distinct paper from the SCIENTIFIC AMERICAN, but of the same size, and published simultaneously with the regular edition.

TERMS.

One year by mail. \$5 60

SCIENTIFIC AMERICAN and SUPPLEMENT, to one address. 7 00

Single Copies. 10

The safest way to remit is by draft, postal order, or registered letter. Address MUNN & Co., 87 Park Row, N. Y.

Subscriptions received and single copies of either paper sold by all the news agents.

VOLUME XXXV., No 12. [NEW SERIES.] Thirty-first Year.

NEW YORK, SATURDAY, SEPTEMBER 16, 1876.

Contents.

(Illustrated articles are marked with an asterisk.)

Table listing various articles such as 'Aloe, the pearly', 'American Science Association', 'Answers to correspondents', etc., with page numbers.

THE SCIENTIFIC AMERICAN SUPPLEMENT.

Vol. II., No. 33.

For the Week ending September 16, 1876.

With 67 Figures.

TABLE OF CONTENTS.

Table listing contents of the supplement including 'THE INTERNATIONAL EXHIBITION OF 1876', 'ENGINEERING AND MECHANICS', 'TECHNOLOGY', etc.

The Scientific American Supplement

is a distinctive publication issued weekly every number contains 16 octavo pages, with handsome cover, uniform in size with SCIENTIFIC AMERICAN. Terms of subscription for SUPPLEMENT, \$5.00 a year, postage paid, to subscribers. Single copies, 10 cents. Sold by all news dealers throughout the country.

MUNN & CO., PUBLISHERS,

87 Park Row, New York.

All the numbers of the SUPPLEMENT from its commencement, January 1, 1876, can be supplied; subscriptions date with No. 1 unless otherwise ordered.

AMERICAN CONTRIBUTIONS TO THE DEVELOPMENT THEORY.

The address which has deservedly attracted the greatest share of attention, out of the many learned essays delivered at the recent meeting of the American Association for the Advancement of Science, is Professor E. L. Morse's masterly summing up of all that America has done to promote the growth of the development theory.

Professor Morse tells us that the first clear premonition of the doctrine of natural selection came from an American, William Charles Wells, borne at Charleston, South Carolina, in 1757. In 1813 Wells read a paper before the Royal Society, in which he attempted to account for the color of dark-skinned races of men by citing the changes of animals under domestication, showing that varieties of men and animals were occurring, not exceptionally, but constantly, and that different breeds of animals were thus obtained by man's selective supervision.

Classifying the work of various American investigators, Professor Morse tells us that in producing new evidences for the doctrine of natural selection, Drs. Burt G. Wilder, Englemann, and W. K. Brooks and Professor Charles V. Riley have borne distinguished parts. Professor Riley's proof of the inter-dependence of flower and insect in the case of the yucca moth is a scientific triumph.

Professors S. F. Baird, J. A. Allen, and Robert Ridgway severally have found that marked differences in birds and mammals are due solely to their surroundings. Thus, for example, Western birds have longer tails than Eastern ones of the same species, and on the Pacific coast birds acquire a darker hue.

As evidences of the transmutation of species, Mr. James Lewis has discovered that a truncate form of mussel, which, by the loss of one of its segments, had been distinguished from another form, takes its peculiar shade from the circumstances to which it had been exposed, namely, the abrasion of its edges and consequent retarding of its growth in the rapid currents of the Mohawk River.

The remainder of Professor Morse's admirable address

sets forth the present theories of Darwin and the evolution school, and more especially dwells upon the gradual development of the intellect of animals. The earliest mammals had the smallest brains; and as we go upward in the strata, the size of the brain gradually increases.

In his conclusion, Professor Morse showed how perfectly the evolution doctrine accounts for the fatalism of the Turks, the cruelties of savages, and the outrages generally among civilized people, attributed to the total depravity of humanity. He considers all such manifestations as simply relapses to the savage nature which we all inherit from animal progenitors; and that where such relapses in any individual become constant, it is the duty of society to treat that individual practically as it would a dangerous beast, and so govern him as to prevent his propagating his kind.

THE COMING EXPLOSION AT HELL GATE.

General Newton has recently stated that the great explosion at Hell Gate will take place during the latter part of September. The excavations have been complete for some time past, but delays in passing the appropriation bill by Congress checked further operations, and for this reason the blow-up did not occur on the 4th of July, as for a long period was contemplated.

The arrangements to guard against any possible danger are being perfected, in utter disregard of the desires both of those who hope to see the great blast, and those who aspire to profit pecuniarily through the popular curiosity. Steamboats and other craft will be warned away, so that a view from the river will be out of the question; the authorities have been requested not to grant passes to would-be spectators on Ward's Island, the best point of observation; and a bluff of earth and the buildings near the works prevent seeing the operations from the rear, so that the expectant populace will probably have to satisfy themselves with a distant view from the high land on the New York shore.

How much powder, etc., will be burnt is not yet definitely stated. An approximate idea of the quantity may be gathered from the fact that there are about 4,000 drill holes, each 3 inches in diameter, and varying from 7 to 13 feet in depth. Each will be charged with a separate canister of dynamite, vulcan, and rend-rock powder, and the simultaneous explosion will be effected by the current from a battery of 800 cells.

CHEAP COAL.

The breaking up of the coal combination and the consequent throwing upon the market of half a million tons of coal is a welcome event. The whole coal trade of the East has, for several years, been under the absolute control of a monopoly which has signalized its sway by unwaveringly maintaining high prices, without regard to the demand first, or the depressed condition of all business affairs.

The fall in rates at the late auction seem to have astonished every one, and none more than the coal dealers themselves. The reduction from the combination schedule for August averages about \$2.10 per ton, and average prices ranged from \$2.20 for Philadelphia & Reading chesnut to \$3.86 for Delaware & Hudson stove.