they think they can be valuable as aids in game-bird conservation. It works out this way: game birds like pheasants and bobwhite will take cover and not move a feather so long as a hawk is overhead. The idea is to have one of the big birds "wait on," as falconers say—circle slowly overhead, while the game refuge keeper searches the brush for them, perhaps with a well-trained dog. With the birds "frozen" in this way, he should be able to make the necessary game censuses and get a close-up view of his birds for health and general conditions, which would not be possible if they were not afraid to break cover.

Use of hawks against crows, which are sometimes destructive to game bird nests and eggs, is probably not so simple a problem, though hawks are used for driving out rooks in England. The trouble is, that a wild hawk knows a crow is no good to eat. If a tame hawk can be prevented from ever tasting crow, by taking his prey away from him promptly and giving him a pigeon already dead, as the rook-hunters do in England, it might help to rid a district of crows. For Corvie is a wise old bird, and will vacate if he finds the neighborhood getting too bad for crow health.

The Craigheads are indignant at the intransigeant attitude of many game commissioners and wardens, who insist on regarding all hawks and owls as "vermin," killing them indiscriminately. Most hawks, and practically all owls, feed largely or exclusively on rodents, and so should be regarded as beneficial birds, entitled to full legal protection and the encouragement of everybody who is a real friend of wildlife.

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MEDICINE

Cortin Promises to Conquer Wasting Disease of Children

CORTIN, the hormone produced by part of the adrenal glands and recently hailed as a life-saving remedy for usually fatal Addison's disease, may prove to be very useful in ameliorating the unhappy effects of a baffling disease of children, muscular dystrophy.

Work done on several cases of progressive muscular dystrophy, hypertrophic muscular dystrophy, and myasthenia gravis, in comparison with other abnormal conditions and normals, was reported by Dr. M. X. Sullivan of Georgetown University to the American Society of Biological Chemists.

A chemist himself, Dr. Sullivan became interested in the muscle disease when he found it was accompanied by certain changes in the body chemistry. In this disease a substance called creatine, which is normally changed in the body to creatinine during muscle activity, is excreted via the kidney as unchanged creatine, scientists found. Investigating further, Dr. Sullivan, aided by Dr. Walter C. Hess and P. Irreverre, found that relatively appreciable amounts of guanidine are excreted in this disease, generally in a combined form readily converted to free guanidine by oxidation with silver oxide or mercuric oxide.

Guanidine is a protoplasmic poison and prevents the passage of an impulse over nerves to muscles. The muscles remain inactive and gradually waste away. Glycine, long considered valuable in checking the progress of the dystrophies, did not eradicate the simple guanidine derivatives but did seem to check the progress of the disease more or less.

Case Described

In one case of a seven year old boy, treatment for several months with cortical extracts taken in pill form brought about changes towards normality. The wasting of the muscle which characterizes this disease was checked, the appetite improved, weight increased, and the excretion of material yielding guanidine ceased.

Dr. Sullivan described a new colorimetric test which he had developed for free guanidine not given by combined guanidines. Material yielding free guanidine he finds is excreted in muscular dystrophies, especially pseudo-hypertrophic muscular dystrophy, but not in a similar disease of adults called myasthenia gravis. Some possibility exists that the cortin treatment taken early may actually have curative value.

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ASTRONOMY

Moon "Rays" May be Mirrors of Volcanic Ash

EVER since the telescope was invented and first turned on the surface of the moon scientists have been puzzled over the cause of great bright "rays" which radiate, like petals on a daisy, from some of its craters. Thirty thousand craters have now been observed on the moon's surface and 30 of them show such "ray" characteristics. Much speculation has been advanced which interpreted the rays as giant valleys or hills that reflected the sunlight back to man on earth.

The committee on Lunar Geology of Carnegie Institution of Washington has just suggested a new explanation of these long bright rays, some of which can be traced for more than a third of the moon's circumference, or over 2,000 miles.

Dr. George W. Munro of Purdue University reports, "it is quite probable that the rays, which to us are such an important feature of the lunar face, would be quite undetectable to one on the moon itself."

The reason appears to be, Dr. Munro suggests, that the highly reflective bright streaks are not great valleys or mountains but rather striplike lunar "mirrors" composed of volcanic ash which covers the earth's satellite.

Each particle of this ash reflects sunlight. In general the ash specks have a random distribution which scatters light in all directions. If, however, the moon were struck a violent blow it is highly possible that vibration waves would be set up on the surface. While persisting for only a short interval of time, such vibrations could orient particles so that their reflecting powers would greatly increase in a given direction.

If one asks where the moon would receive a violent shock that could cause the vibrations scientists point to the already existing evidence of the havoc wrought by millions upon millions of meteor impacts on the moon.

The moon, Dr. Munro reports, (*Science,* April 26) has its history plainly written on its face. Its larger craters are easily classified as to age. (*Turn Page*)

"It is notable," Dr. Munro says, "that those craters with 'rays' are all classified as 'young,' with sharply defined edges and little evidence of more recent disturbance. This is as we should expect, for whether we consider volcanic or meteor impact activity, every movement of materials covers existing landscape features including the rays, which, having little height, would be easily obscured and so observable only in connection with the later craters."

The present interpretation, therefore, adds one additional link in the now strong chain that many of the lunar craters are of meteoric origin.

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PHYSIOLOGY

Pituitary Gland Is Nature's Sculptor, Molding Human Face

THE PITUITARY gland at the base of the brain, master of all endocrine glands of the body, has another role. It is Nature's sculptor which models the head, face and features of man. The mechanism by which the pituitary plays this newly-discovered "sculptor" role was disclosed by Dr. Hector Mortimer, of McGill University, at the meeting of the American College of Physicians.

Finding how the gland acts to change facial features will aid the endeavors of physicians to diagnose and treat disorders of the gland. Dentists will also be aided in their own problems of facial and palatal growth.

Scientists have for years studied the question of the mode of growth in the human face in an endeavor to solve the question of those changes which make the Mongoloid features so different from either the Negroid or those of the white race, the Caucasoid.

Since the time of the great English anatomist, John Hunter, it has been known that facial bones—the foundation of the features—change through infancy to full adulthood by a process of modeling. It is as if a sculptor had, with his thumb, removed human clay from one part to smear it on another. Hunter showed that this occurred by the simultaneous processes of resorption in one area and deposit in another.

While Hunter's observation of this process of bone growth and development was true, it gave no indication of the mechanism by which it happened. Today confirmation has been given his observation and the mechanism explained in the light of modern knowledge of the pituitary gland.

It is the pituitary gland which, elaborating hormones that control growth in all its aspects, plays the dominant role in this mechanism. Removal of the pituitary in rats, Dr. Mortimer showed, stops entirely that differential part of growth which is called development—the process by which the small baby face of childhood becomes the large, well-grown, firm-jawed face of the adult man.

The essential process of resorption by which bone increases in size is made possible by the somatropic hormone from the pituitary, Dr. Mortimer said. This hormone lightly decalcifies the bony structure and expands its vascular bed. When the impulse to grow diminishes, consolidation takes place by a mechanism which is the reverse of that producing the expansion. In short, the flow of gain is followed by the ebb of consolidation.

Dr. Mortimer showed the process of expansion depends on the purified growth fraction of the anterior pituitary which today is labeled the somatropic hormone, and which is entirely free from any physiological effect on either thyroid, adrenal, or sex glands.

But the process of consolidation is less certain. It may occur, Dr. Mortimer indicated, through the intermediary action of the parathyroid glands in the neck, possibly as a result of stimulation of these glands by a parathyrotropic hormone also formed in the anterior pituitary. This latter hormone has not yet been identified but there is presumptive evidence for its existence which receives support from such scientists as Houssay of Buenos Aires and others, Dr. Mortimer said.

By the four types of characteristic cranial change which he demonstrated as occurring in over ninety per cent. of the pituitary cases in the University Clinic of the Royal Victoria Hospital, Montreal, Dr. Mortimer offered a new datum for the use of physicians treating glandular disorders and those specializing in the treatment of children.

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ARCHAEOLOGY

Germans Probe Old City Named in Book of Genesis

ERECH, named in the Biblical book of Genesis as one of the first cities built in the world by King Nimrod, mighty hunter, dates back to between 3000 and 4000 B.C., German archaeologists have discovered.

The seventh German expedition to Erech, or Uruk or Warka, as it is variously known, has been excavating since November at the Biblical city, and reports a successful season of discoveries. No less than 18 layers of ruins lie piled at the site near the Euphrates, in southern Mesopotamia.

The expedition has succeeded in tracing the complete course of the wall which encircled the ancient city five and one-half miles round. At least one-third of the huge area thus enclosed was taken up with "holy places."

The excavators are concentrating on layers dating from about 3000 to 4000 B.C. Tunnels driven under a temple tower of about 2300 B.C., revealed temple votive offerings and other relics belonging to cities of earlier periods.

Elsewhere in the city, a temple of about 321 to 64 B.C., the time of the Seleucid Empire, was found. Beneath this lay ruins of an older temple of great size, measuring about 350 feet by 262, and with walls almost 20 feet thick.

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CHEMISTRY

Isolation of Pure Vitamin A Near

A NEW world's chemical record for concentrating vitamin A, food constituent vital for normal growth, resistance to disease and general "pep" producer, was reported to the American Chemical Society.

Dr. Harry N. Holmes and his co-workers at Oberlin University described new developments in the advance toward the long sought goal of complete isolation of the vitamin in 100 per cent. purity.

While admitting the goal is not yet attained they reported the production of a fluid 14,000 times as concentrated as standard cod liver oil. This is a 40 per cent. gain over the previous world's record made in 1931 by Prof. P. Karrer of the University of Zurich, Switzerland. The Swiss concentrate was only 10,000 times as potent as the standard oil.

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