ing the Recent fauna, and overlies the deposit in which Pleistocene vertebrates are found. In excavating the older bed dense accumulations of mammalian remains were encountered. This deposit is in general comparable to these occurring at Rancho La Brea. The exhumed material was, however, not so well preserved as that from the asphalt bed near Los Angeles. This seems due, in a measure, to a prevailing earthy matrix showing somewhat less impregnation by petroleum than in the Rancho La Brea beds.

A small collection of bird remains from the McKittrick deposit was submitted to Dr. L. H. Miller for examination. A preliminary statement has been kindly given by Dr. Miller as follows:

1. Of the ten species thus far determined, six are aquatic or semi-aquatic in habit. With more careful examination to determine exact identity of ducks and waders, this proportion will be increased. Quite the reverse is true of the Rancho La Brea beds.

2. The golden eagle (*Aquila chrysaëtos*) is the most abundant species of land bird. One hawk (*Circus*), one caracara (*Polyborus*), and two falcons (*Falco sparverius* and *F.* near *fuscocerulescens*) are the only other raptors. No owls or vultures appear in the collection.

3. *Parapavo* is not represented. A single quail bone represents the great group of Gallinæ.

4. Shore birds (Limicolæ), so rare in the Rancho La Brea beds, are very abundant here. More specimens of this group are present in the collection of 100 specimens from McKittrick than in all the 50,000 examined from Rancho La Brea.

5. So far as examined there appear no extinct or extra-limital species not found at Rancho La Brea. On the other hand *Teratornis*, *Parapavo*, the great list of condors, vultures, eagles, old world vultures, and owls are thus far lacking.

6. The caracara, the indeterminate falcon, and the two storks, *Ciconia* and *Jabiru*, give the same suggestion of semitropic climate as in the case of Rancho La Brea.

Following is a provisional list of the Pleistocene mammalian fauna known from the McKittrick locality:

Ænocyon dirus (Leidy)
Canis, near *ochropus* Esch.
Felis atrox Leidy
Felis, near *daggetti* Merriam
Arctotherium, near *simum* Cope
Mylodon, sp.
Equus occidentalis Leidy
Antilocapra?, sp.
Bison, sp.
Camel, slender limbed form
Mastodon, sp.

Several of the mammalian species listed above are known from Rancho La Brea. The dire wolf (*Ænocyon dirus*), the great lion (*Felis atrox*) and the horse (*Equus occidentalis*) also occur in the asphalt beds near Los Angeles. Machaerodont cats have not been recognized at the McKittrick locality. The bear (*Arctotherium*) and the ground sloth (*Mylodon*) occur in both deposits, although the forms represented at McKittrick may be specifically separable from the types found at Rancho La Brea. A camel with slender limbs is certainly distinct from the large *Camelops hesternus* found at Rancho La Brea.

Further collecting at the McKittrick locality will bring out the relationship between this assemblage and the Rancho La Brea fauna. The contrasting features that are recognized at present may result from a geographic separation of the two asphalt deposits. It is probable that the environmental conditions prevailing in the southern portion of the Great Valley of California during the Pleistocene were somewhat unlike those existing in the vicinity of Rancho La Brea. On the other hand, it may be that the faunal differences are to be interpreted as indicating separate stages of the Pleistocene.

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SPECIAL OIL-IMMERSION OBJECTIVES FOR DARK-FIELD MICROSCOPY

DARK-FIELD microscopy was introduced by Joseph Jackson Lister in 1830, and by the Rev. J. B. Reade in 1837. The optical principles were clearly enunciated by F. H. Wenham in 1850–1856, and apparatus substantially as now employed was made and described by him for use with high powers.

In 1877 Dr. James Edmunds constructed special paraboloid condensers for dark-field work with high powers, and insisted upon the necessity of a homogeneous contact of the top of the condenser and the lower face of the microscopic slide, and that the slide should have a thickness corresponding to the focus of the condenser. He recommended this means of study for the body fluids like blood, etc., and for the investigation of living bacteria, whose appearance and actions were described by him in a most striking and picturesque manner.

This information was published in some of the most important and widely distributed English publications (*Transactions of the Royal Society*, 1830, *Trans. Micr. Soc. of London*, and *Quart. Jour. Micr. Science*, 1850–1856; *Jour. Quek. Micr. Club*, and *Month. Micr. Jour.*, 1877; Quekett's "Treatise on the Microscope," 1848–1855, and Carpenter's "The Microscope and its Revelations," 1856).

In spite of this wide publicity the dark-field microscope was used very little either in biology or in medicine. After the discovery in 1905 of the microbe of syphilis, and that it could be demonstrated in the living state with the dark-field microscope, this method of investigation became of vital importance to medical men; and that importance has increased rather than diminished in recent years.

It seems to the writer that it is of equal if not greater importance to the biologist, the physiologist, and the clinician for the examining of the body fluids in health and disease and in the study of living micro-organisms, for it brings out with the greatest clearness structures and details of structure invisible in the bright-field microscope. It thus renders the absolute dependence on staining agents after various fixing materials have been used no longer necessary, and serves as a check to the appearances sometimes given by these agents.

Dark-field microscopy has two requirements that must be met for its successful use as was pointed out by the early investigators with it: (1) a very brilliant light is needed. Full sunlight was recommended and remains the most satisfactory light, although the newly devised electric lights like the small arc lamp and the low-voltage head-light lamps serve very well.

(2) The other difficulty that must be overcome is the large aperture of high-power objectives, especially those of the immersion type. This is because the dark-field condensers can not be constructed with high enough aperture to give a dark-field with these high-power objectives, and they are a necessity with the most exacting work.

Two courses were open with the high powers: (*a*) To so construct them that the aperture was low enough to give dark-field effects with the dark-field condensers practicable to construct, and (*b*) To introduce into the high apertured objectives a diaphragm that should cut down the aperture.

The second course was adopted, and reducing diaphragms of all kinds with apertures varying from 0.40 to 0.90 N. A. have been met with; and in a few cases those as low as 0.20 N. A. were found. Not only was there great variation in the aperture of the reducing diaphragms for the oil-immersion objectives, but in many cases they were so constructed that they were liable to get out of place, get out of the optic axis, and prove generally unsatisfactory. Unfortunately also some of the workers in the pathological field were trying to use oil-immersion objectives for dark-field work with no diaphragm at all, and of course could get no dark-field effects.

After a full examination of the different dark-field condensers made in our own country and abroad, it seemed to me that the best all around aperture for the objective to use with them would be about 0.80 N. A. Such an aperture will give a good dark field with all the standard dark-field condensers, and this aperture is great enough to give good resolution on the one hand and the needed brilliancy on the other.

I appealed to the American manufacturers of microscopic objectives to design and manufacture oil-immersion objectives of this aperture (0.80 N. A.). With such an objective the worker either in biology or in medicine can get good results even without a very profound knowledge of the optical principles involved. He can also go forward with his work with full confidence that the objective being used will give good results, and every worker knows the importance of confidence in his apparatus for successful accomplishment. Finally, during the past summer and autumn the Bausch and Lomb Optical Company of Rochester, N. Y., undertook the manufacture of the desired medium-apertured oil-immersion objectives. The outcome is all that could be asked; and they have been subjected to the most rigid tests in actual practise in the fields in which dark-field work is applied. These objectives are now available, and the writer feels confident that every one using them will feel grateful for the freedom from worry that was always involved in modifying a high-apertured objective for the dark field.

It is only fair to add that no matter how enthusiastic one may be over the possibilities of dark-field microscopy, much more skill is necessary in it than for the ordinary bright-field microscopy. I think that all who have used the dark-field microscope successfully will agree that the ideal plan for an individual or for a laboratory is to have a microscope devoted to this work alone. If then a proper electric light is available, one can proceed to make examination of specimens with the dark-field microscope with the same certainty and rapidity with which examinations are made with the bright field.

It may be stated in passing with reference to these new objectives, that they have certain advantages for ordinary bright-field work. As ordinarily employed the oil-immersion objectives of high aperture (1.40 to 1.20 N. A.), are used in bright-field work without oil-immersion contact between the under surface of the slide and the top of the bright-field condenser. As light of an aperture greater than 1.00 N. A. can not emerge from the condenser into air, it follows that not nearly all of the available aperture is employed. It was believed therefore that these medium-apertured objectives would serve to give practically as good images for histological, embryological and pathological specimens as the high-apertured objectives as ordinarily used. Actual tests proved the correctness of this supposition. Of course when the resolution of fine details is involved the higher aperture is of great importance, but in order to be fully utilized the microscopic slide must be in immersion contact with the top of the condenser.

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THE INTERNATIONAL GEOLOGICAL CONGRESS COMMITTEE

AT the twelfth session of the International Geological Congress, the president was instructed to nominate a committee to consider the question of a permanent constitution and to submit a proposal thereon to the next session of the Congress. The following committee was appointed: R. W. Brock, President; J. S. Anderson, C. Barrois, A. Karpinsky, A. Renier, Geo. Otis Smith, G. Steinmann and E. Teitze.

The committee met in the rooms of the Geological Society of London on July 20, 1921. There were present: R. W. Brock, President; A. Renier, Geo. Otis Smith and F. D. Adams (ex-officio member).

At a preliminary conference called to obtain for the guidance of the committee the opinion and advice of a wider and more representative body, the following resolution had been passed:

> That this meeting is of opinion that the question of the establishment of an International Geological Union should be considered at the next International Geological Congress, and that it is undesirable that any steps should be taken until the question has been so considered at a full and representative gathering of geologists.

A concise proposal with regard to a constitution to submit for the consideration of the next International Geological Congress was drawn up, the main points of which are as follows:

> The purpose of the International Geological Congress, it was stated, is to advance scientific investigations relating to the earth from the point of view