selves hydrophilic, hence the assumption of an oil film completely enclosing each grain is untenable.

If a mass of clay-water-oil paste be left floating on a soda (washing soda) solution for some time, the silicate particles gradually free themselves from the emulsion and sink. But each drags down with it a tiny droplet of oil, just easily visible with a 10× pocket magnifier, attached to its top. The soda has completely freed the surface of each grain from oil but has *not* destroyed the attraction of the solid particle for the oil droplet. Such behavior is not readily accounted for by either the mechanical or chemical theories of adsorption. An electrical theory would account for it if a particle of one dielectric partly immersed in another had an opposite charge induced on the remaining part. I find no reference to any such law in the literature, but it is plainly consistent with the current theory of dielectrics.

In the oil fields conditions are frequently ideal for emulsion formation. During drilling, oil and mud are intimately mixed by the drill bit. During flowing and pumping, flow through the fine capillaries of the oil sands will produce emulsions if free sand particles and water are present. Such emulsions in most cases represent a dead loss, for there is no efficient chemical method of separating the oil at a reasonable expense. The high voltage electrolytic method (Cottrell process) effectively separates the particles constituting the emulsion but requires expensive apparatus.

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EXCYSTATION OF COCCIDIAL OOCYSTS IN VIVO

WHILE excystation of coccidial oocysts has been observed and deliberately produced *in vivo* by various observers the phenomenon has not been put to the practical use of which it is capable. Segmentation of the oocysts is the usual method of determining the viability of coccidial oocysts, but the limitations of this method lie in the fact that only unsegmented oocysts may be thus tested. Excystation is a reliable criterion of viability that can be used to determine the length of life of oocysts after segmentation, the action of physical or chemical changes in the environment of segmented oocysts or of any other experimental procedure which can be tested by a conclusive manifestation of life within the matured oocyst.

The author has repeatedly carried out excystation *in vivo* using the following simple technique. Segmented oocysts from cats, dogs, guinea-pigs, pigs and prairie-dogs have been used with equal success; probably any species of coccidia from birds or mammals can be used. Young rats (75 to 100 grams) are deprived of food and water for twenty-four hours preceding the experiment. This has the double advantage of making the animal eager to eat and of thoroughly emptying the stomach and small intestine. The ripe oocysts are concentrated by centrifugation. If they have been exposed to any unpalatable chemical which may have been used to prevent putrefaction or for some experimental purpose, the chemical must be removed by dilution with water and centrifugation. The concentrated oocysts are suspended in four or five drops of sweet milk. The material is offered to the starved rat and will be immediately consumed. Sixty minutes after the ingestion of the oocysts, the rat is killed and the intestine is removed. At various points throughout its length it will be observed that the small intestine is distended with white contents. At these points the intestine should be opened and the contents observed microscopically. By examining various places in the intestine, all stages of excystation, if the ingested oocysts were normal, may be found, including motile sporozoites within and outside of the oocysts.

When using this method for experimental purposes, one or more control animals fed with untreated oocysts of the same lot from which the experimental were obtained should be included in the experiment.

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INVESTIGATIONS OF APPLICATIONS OF IODINE

FOR some time past, especially in Europe, considerable research attention has been accorded to the investigation of various proposed uses of iodine. This element, while less fortunate commercially, perhaps, than its congener bromine, which among other industrial applications has achieved importance in the manufacture of a widely used "anti-knock" motor fuel, is known to play a vital rôle in physiology, which fact may lead, it is thought, to the extension of its utility in food and medicine as well as in agriculture. Through the brilliant investigations of Kendall, Harington, McClendon and others, the intricate biochemistry of iodine has received much illumination. There remain, however, many unsolved questions regarding its physiological functions, especially in the lower animals.

These reasons led the Iodine Educational Bureau to establish on January 1, 1928, a multiple fellowship at Mellon Institute. This fellowship, having as its objects the investigation of possible technologic uses of iodine and also collaboration with other institutions interested in research on this element, is headed by

Dr. George M. Karns, who was formerly a member of the chemical faculty at the University of Illinois. All experimental findings of the work will be made available for general use through the scientific journals.

A recent appropriation from the Iodine Educational Bureau has enabled the fellowship to expand its activities by arranging for the study at the Pennsylvania State College of the nutritional functions and value of iodine in the feeding of live-stock. This comprehensive project, begun on September 26, 1929, under the direction of Professor E. B. Forbes, of the Institute of Animal Nutrition, will include studies on cattle, sheep and swine. Such information is much needed, because most of the work on the part played by iodine in metabolism, especially with reference to the thyroid, has been confined to man. Dr. Karns and his associates at Mellon Institute are cooperating in this research, chiefly by preparing standardized feeds.

The institute, acting for the iodine fellowship, has also made arrangements for another investigation under the supervision of Dean Charles H. LaWall, of the Philadelphia College of Pharmacy and Science. A scholarship, which will be held by Mr. L. F. Tice during the college year 1929–30, has been established at that institution for the purpose of making a broad study of vehicles and solvents for iodine with the view of evolving a more satisfactory preparation for medical use than the tincture now employed. A number of new organic chemicals will be studied according to a definite program which has been worked out.

Mellon Institute is also considering, with the advisory aid of a number of pharmacologists, the founding of a medical research scholarship for the purpose of aiding in the solution of questions regarding the utility of iodine in internal medicine. A foundation of this type would, of course, be made in some institution possessing special facilities for such research.

The results of all work, both of the iodine fellowship at Mellon Institute and of the scholarships founded at other institutions, will be made available to the public through scientific periodicals. This procedure is in harmony with the Iodine Educational Bureau's general policy of releasing the findings of all investigations made under its auspices.

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WHAT IS THE BEST SYSTEM OF PRESENTING BIBLIOGRAPHIES?

IN the issue of SCIENCE for August 30, 1929, Dr. J. L. St. John very appropriately calls attention to the desirability of a more uniform system of presenting bibliographies in the various scientific journals. With reference to the name-number and name-date systems of citing literature, however, he says "It would seem that the advantages of the name-date system justify its use in practically all cases" and "A number associated with the author's name has no value except in helping locate the reference in the bibliography." In view of these statements it seems desirable to call attention to the other side of the question. As there are journals, editors and writers who prefer the name-number system there must be good reasons for using it.

A working corollary of the name-number or numerical system is that the list of literature citations is arranged alphabetically. This arrangement, however, is only an additional advantage of the system and can be disregarded if it is preferred that the numbers be assigned to references in the order in which the references appear in the text or in chronological order or in the order of importance or in any other order determined upon. Aside from the convenience attaching to the use of numbers in the list of references, the major advantage is derived from their use in the text.

To give one of many examples of this advantage, I quote from a comparatively recent publication: "This is fully covered in the literature (2, 8, 14, 17, 18, 20, 22, 25, 29, 32, 41, 59, 60, 61, 64, 66, 68, 83, 85)." If these citations had been given according to the name-date system the following would have been the printed result: "This is fully covered in the literature (Anonymous [1903]; Atlantic City Academy of Medicine [1902]; Banks [1927]; Broadbent [1895]; Brooks [1916]; Bulstrode [the date of publication was 1904, but the report covered in this instance was for 1902–03]; Bundesen [1925]; Chantemesse [1896]; Conn [1895]; Eade [1895]; Harris [1925]; Lankester [1885]; Lumsden, Hasseltine, Leake and Veldee [1925, but the report was for the year 1924–25]; Marvel [1903]; Mosny [1899]; Newsholme [1903]; Pease [1911]; Stiles [1912]; Thresh and Wood [1902])."

In addition to the increased volume of text and expense of publication there is the greater liability of citation errors when so many names and dates are included. Not infrequently an author gives group citations many times in his paper. The page references are sometimes included in the group citations, and there may also be several citations of the same year or of different years from the same author. In the latter case it is necessary to differentiate between the citations of the same year from one author by the addition of the letters a, b, c, etc., thus further complicating the situation. Another objection to the name-date system occurs in connection with the cita-