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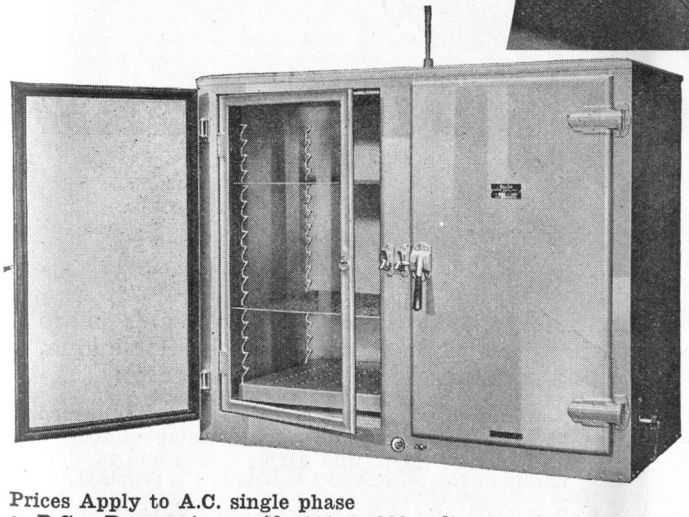

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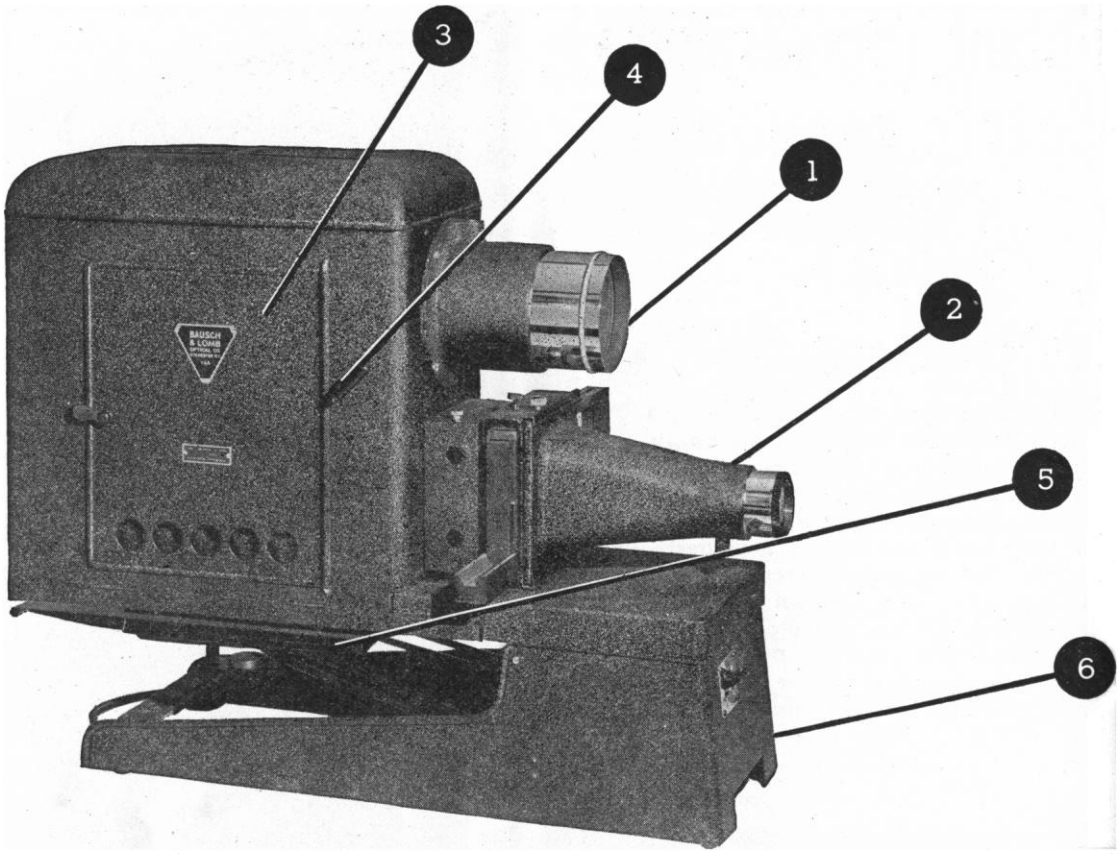

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PROGRESS IN PETROLEUM[1]

By Dr. GUSTAV EGLOFF

RESEARCH LABORATORIES OF THE UNIVERSAL OIL PRODUCTS COMPANY, CHICAGO, ILLINOIS

CRUDE petroleums range from almost pure gasoline to solid asphalt as produced in the oil fields of the world. They have odors ranging from the rose and musk to a vileness greater than the skunk. Their colors when viewed in transmitted light vary from cherry, amber, yellow, green and reddish-brown to dense black, and under reflected light some crudes are highly fluorescent. Crude oils are composed of paraffinic, olefinic, naphthenic and aromatic hydrocarbons. Many crudes contain sulfur in combination with the hydrocarbons—in amounts from traces to more than six per cent.—while nitrogen and oxygen varies from 0.1 to more than one per cent. Traces of metals such as platinum, gold, silver, uranium, vanadium and titanium have been found in some crude oils. A few Rumanian crude oils are highly radioactive.

Crude oils are literally a wonder source of substances that are the foundation stone of a number of industries with many more to come. Their effect ramifies throughout our social and economic life and they will be a controlling factor in ultimate victory in a world aflame.

A forward-looking group of executives, chemists, physicists, engineers, and a host of other professions have made the oil industry what it is—a $14,000,000,000 organization in the United States. An amazing amount of research is going on in every branch of the industry at an expenditure of over $100,000,000 a year in order to discover and transport crude oil to refining centers for conversion into products useful to man.

The oil industry is doing everything possible to locate

[1] Address on the occasion of the presentation of the Medal Award of the American Institute of Chemists at its eighteenth annual meeting, Atlantic City, N. J., May 18, 1940.

materials, a scientist may make his own microfilm and greatly increase his library at a cost of less than one cent per exposure.

It is not intended that such individually-made film should compete with that produced by bibliofilm service on long runs where the service charge is negligible in comparison with the total cost. However, there are numerous short articles, tables, diagrams, bibliographies, graduate theses, etc., which are desirable to have on file but which can not be obtained as reprints. This is particularly true of foreign publications and those trade journals which do not furnish reprints, and of detailed tables on analytical procedures from bound volumes, any of which may be borrowed for a short time from a library. For this class of work, an ordinary 35-mm candid camera, ranging in price from ten dollars up, when provided with a copying lens and cable release, is quite satisfactory. A copying lens costs a dollar and a cable release about 75 cents. Film developing can be done in an inexpensive daylight developing tank. Commercial photographers charge approximately 10 cents per roll (36 to 42 frames). Ordinary film can be obtained in 25-foot rolls at less than one cent per frame. (One-hundred-foot rolls—about 700 frames—cost about $3.00.) This film is suitable for reading with a hand reader. However, if the film is to be used in projection reading machines where it will be exposed to heat, it will be necessary to use safety-base film.

Apparatus: In the following work an Argus Model C camera, fitted with a portrait lens and a cable release, was used. The camera, with the lens pointing downward through a two-inch hole, was mounted on a specially prepared board. The camera was held in place by strips of wood around three edges; thinner strips held the face of the camera up from the board to give clearance for the shutter lever. The camera was held firmly but could be easily removed for other uses. This wooden frame was wired securely to a 6-inch ring and a large ring stand was used as a support. With the ring used, the camera lens was 6.5 in. from the rod, and this proved satisfactory for ordinary books and journals. If larger objects, such as a newspaper, were to be photographed, an extensible support would be necessary. The field covered was 8.75 in. by 13.25 in. at a height of 20 in. and 12.5 in. by 19 in. at a height of 28 in. It is helpful to have the upper and lower part of the ring stand rod marked in inches so that the height may be adjusted. Two T-shaped rods were used with ring stand clamps to hold down the edges of the journal being photographed. It is well to set the stand on a black cloth to avoid glare from polished table tops. After adjustment, it is advisable to steady the support by a brace from a second ring stand to reduce the possibility of vibration. Either strong indirect daylight or artificial light may be used for illumination.

Operation: The article to be copied was centered in position and the pages held level with the T-shaped rods. The name of the journal, date, etc., if not appearing in the article, was printed on a card and laid on the margin of the article. (This card may be used to cover portions of other articles appearing on the same page. If the microfilm is to be filed by number or subject, this data may be added and inch figures, after photographing, may be easily read without optical aid for ease in filing.) The camera support was placed at the proper height and the camera put in position. A cable release was used to avoid vibration, and the exposure was made. Time and diaphragm opening will vary according to the lighting, and a little experimentation will fix the optimum conditions. With daylight, in a well-lighted room and with fast film (Scheiner No. 23), equally good results were obtained with an exposure of 10 seconds at f:11 and 0.2 second at f:3.5. The f:11 diaphragm opening allows considerable latitude in focusing, which is helpful if journals of different thicknesses are used, since the camera height need not be changed. It was not necessary to remove the camera between exposures, the shutter being cocked by inserting the eraser end of a pencil between the support and the camera.

Discussion: The method described has been found to be very satisfactory for the making of short runs of microfilm. The films are conveniently stored in numbered glassine or kraft paper envelopes and correspondingly numbered cards are kept in the regular filing system. (Dice[5] and Brown and Austin[6] have described filing systems for microfilm.) Films should not be developed to high density and contrast because the softer grey background is easier on the eyes than a dense black. For diagrams with tiny numerals, it is desirable to take close-ups particularly when the film is to be examined with a hand reader.

J. DAVID REID

AMES, IOWA

[5] L. R. Dice, SCIENCE, 89: 39–40, 1939.
[6] H. P. Brown and J. A. Austin, SCIENCE, 90: 573–574, 1939.

BOOKS RECEIVED

Cancer; A Manual for Practitioners. Pp. viii + 284. Rumford Press, Boston, agent for Committee on Publication representing the Massachusetts Medical Society and the American Society for the Control of Cancer.

FASSETT, NORMAN C. *A Manual of Aquatic Plants.* Pp. vii + 382. Illustrated. McGraw-Hill. $4.00.

MENKIN, VALY. *Dynamics of Inflammation; An Inquiry into the Mechanism of Infectious Processes.* Pp. xii + 244. 50 figures. Macmillan. $4.50.

VISSCHER, MAURICE B., Editor. *Chemistry and Medicine; Papers Presented at the Fiftieth Anniversary of the Founding of the Medical School of the University of Minnesota.* Pp. 296. Illustrated. University of Minnesota Press. $4.50.