ing Step 5. With a little experience, this procedure will result in a demonstration of fine chromatin detail. This step is most useful in those cases where a diagnosis rests upon the condition of the nucleoli.

From September 1947 to September 1950, this method has been applied to more than 2,000 clinical cases where there was some reason to suspect the existence of carcinoma of the uterus. The accuracy of the method was found to compare very favorably with reported accuracies for conventional, polychrome methods. These statistics will be reported in detail in another communication. Preliminary studies indicate that the method can be applied equally well to centrifuged concentrates of gastric washings and secretions of the respiratory tract.

The following technical advantages for the silver impregnation method may be listed: (1) The procedure is relatively simple, rapid, and inexpensive; (2) chromatin elements are deeply impregnated with silver carbonate; (3) counterstains are not necessary; (4) the masking effect of large numbers of erythrocytes is avoided; (5) silver carbonate impregnated smears are less fatiguing to examine than polychrome-stained smears; and (6) the diagnostic accuracy of the method compares very favorably with accuracies reported for other methods.

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The Use of Ultraviolet Light as a Means of Diagnosing Carnation Mosaic[1]

W. D. Thomas, Jr., R. R. Baker,[2] and Joseph G. Zoril

Department of Botany and Plant Pathology, Colorado A and M College, Fort Collins

Virus diseases of the carnation (*Dianthus caryophyllus* L.) recently assumed greater importance when increased efforts were made to produce virus-free foundation stocks. However, in cleaning up these stocks the recognition of mosaic symptoms is often difficult, because of the narrow leaf in many varieties and because of complications from the effects of temperature variations and nutritional disturbances upon manifestations of symptoms.

Differential stains have been used to detect the presence of viruses in other plants (*1–3*), but they have not proved satisfactory in detecting carnation mosaic. The species *Dianthus barbatus* L. (*4*) has been found to be a satisfactory symptom indicator for carnation mosaic virus, but the technique of using it consumes much time and space.

TABLE 1

THE COMPARATIVE EFFECTIVENESS OF ULTRAVIOLET LIGHT AND INOCULATION OF *Dianthus barbatus* AS MEANS OF DIAGNOSING CARNATION MOSAIC

Variety	Total no. plants tested	No. infected plants as determined by	
		Ultraviolet light	*D. barbatus* inoculation
Scarlet King	4,895	4,868	4,869
Dark Pink Virginia	928	922	925
Hercules Virginia	6,993	6,993	6.993
Donna Lee	6,602	6,593	6,593
Pelargonium	3,505	3,470	3,471
Miller's Yellow	2,941	2,939	2,939
Northland	578	577	577
Dark Pink Patrician	2,180	2,167	2,170
Frosted Pink Patrician	3,936	3,936	3,936
White Patrician	3,205	3,205	3,205
Total	35,763	35,670	35,678

MacLean and Kreutzer (*5*) reported that fluorescence in ultraviolet light offered a possible means for diagnosing potato virus diseases. The fluorescence of plant extract in ultraviolet light has been reported to reveal the presence of streak in carnation material (*6*). The same method also revealed mosaic, but it was subject to such variation that recognition was often not accurate. A modified procedure, which has proved useful in detecting mosaic virus in carnations, is reported here.

The process consists of preparing a sample of plant extract by cooking 2 g of carnation terminal vegetative shoot in 10 ml of distilled water for 45 min at 15 lb pressure.[3] The cutting is then removed, and 2 ml of *n*-butanol added to the solution. The solution is shaken vigorously and allowed to settle. A drop of concentrated NH_4OH is added to the solution to increase the pH. To detect the presence of the virus, the solution should be placed before a 250-w G-E Mazda mercury-arc lamp, type A-H4, using filter No. 41,[4] which transmits light with wavelengths between 3,253A and 4,200A. Extracts of mosaic-infected plants fluoresce a light-pink color at the interface between the water and the butanol. Solutions from virus-free plants have no similar fluorescence.

The efficiency of this technique was tested over 3 years' time by examining extracts from 35,763 cuttings from 11 carnation varieties: 4,895 Scarlet King; 928 Dark Pink Virginia; 6,602 Donna Lee;

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[2] Formerly graduate assistant with grant from Colorado State Flower Growers Association.

[3] The assistance of August Mussenbrock and W. D. Holley, of the Department of Horticulture, in securing and preparing materials is gratefully acknowledged.

[4] Manufactured by Switzer Brothers, Cleveland, Ohio.

3,505 Pelargonium; 1,647 Pink Patrician; 2,941 Miller's Yellow; 578 Northland; 533 Dark Pink Patrician; 6,993 Hercules Virginia; 3,936 Light Pink Patrician; and 3,205 White Patrician.

Five test plants of *D. barbatus* were concurrently inoculated with an extract from each of the carnation plants tested, using a carborundum powder No. 320 as an abrasive. Equal numbers of plants of uninoculated *D. barbatus* were maintained as controls. Table 1 compares the results obtained with the two techniques.

These data show only very slight differences between results from the ultraviolet light test and those obtained by inoculation of *D. barbatus*. This ultraviolet-fluorescence technique has proved useful for more than 2 years in indexing carnation cuttings for foundation stock. The identity of the fluorescent material is not known. It very likely is not the actual virus, however, because the heat and butanol treatment would have precipitated any protein present during preparation.

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Abundance of N^{15} in the Nitrogen Present in Crude Oil and Coal

Paul V. Smith, Jr. and Boyd E. Hudson, Jr.

Esso Laboratories, Standard Oil Development Company, Linden, New Jersey

A recent paper by White and Yagoda (*1*), disclosed an apparent correlation between the concentration of the N^{15} isotope and the geological age of the pitchblende ores. The abundance of N^{15} increased from the 0.371 ± 0.002 atom % present in the atmosphere today to as much as 0.614 ± 0.012 atom % in a uraninite sample $1{,}050 \times 10^6$ years old.

TABLE 1

N^{15} CONTENT OF SEVERAL COALS AND CRUDE OILS

Description	Geological age in yr ($\times 10^6$)	Atom % N^{15}
Crude oil, Leduc No. 1, Alberta, Canada	290 (Devonian)	0.3715 ± 0.0003
Crude oil, Lloydminster No. 3, Alberta, Canada	105 (Lower Cretaceous)	0.3725 ± 0.0013
Coal, Atoka formation, Seminole, Okla.	230 (Pennsylvanian)	0.3740 ± 0.0016
Coal, Frontier formation, Little Horse Creek, Wyo.	70–110 (Cretaceous)	0.3687 ± 0.0002
Cylinder nitrogen		0.3705 ± 0.0005
Comparative Data by White and Yagoda (1)		
Atmospheric nitrogen		0.371 ± 0.002
Uraninite, Wilberforce, Canada	1,050	0.614 ± 0.012

Inasmuch as no hypotheses were presented which adequately explained this correlation, it seemed of interest to us to see if this same phenomenon might apply to the chemically bound nitrogen found in crude oils and coals. If some such time scale could be established for determining the age of nonradioactive geological samples, it would be of great value to the petroleum geologist in particular.

The nitrogen samples were obtained by the conventional Dumas analytical combustion. The azotometer was then connected through a liquid nitrogen trap to the gas inlet system of a G-E analytical mass spectrometer. In all cases, the gas analyzed contained over 99% nitrogen. Trace amounts of oxygen and water were obtained in several of the samples. As also observed by White and Yagoda, a small peak at mass 30 was found, which may be attributed to $N^{14}O^{16}$.

As shown in Table 1, the percentage abundance of N^{15} in the nitrogen obtained from the organic matter in the oil and coal is essentially the same as found in the atmosphere today. In no case was the deviation greater than the probable over-all reproducibility of the experiments. The values shown in the table are the average of at least three mass spectrographic analyses on each sample.

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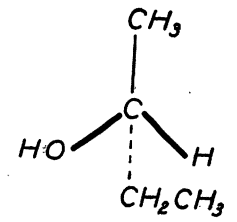
Internal Consistency of Determinations of Absolute Optical Configuration by the One-Electron Theory of Optical Rotation

John F. Lane

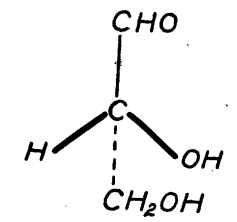
The School of Chemistry, Rutgers University, New Brunswick, New Jersey

In 1938 Eyring and his co-workers (*1*) developed the one-electron theory of optical rotation and, with its aid, assigned to (−)2-butanol the absolute configuration I

I



II



an assignment which was in harmony with the traditional assumption (*2*) of II for the configuration of (+) glyceraldehyde and which agreed with theoretical treatments of this problem by Kuhr (*3*) and Kirk-