INTRODUCTION

The staff of the Liquid Crystal Institute has had a fruitful year during which time significant contributions have been made toward our understanding of the properties and structure of the liquid crystalline state of matter. These findings involve both inanimate materials and animate matter.

The Institute was visited by many scientists from the United States and several foreign countries. The foreign countries include Italy, New Zealand, Sweden, India and France. The visitors from the States were primarily from industrial companies; however, we did have a number of visitors from academic institutions.

Industrial laboratories, academic institutions, hospitals and other organizations have sought advice and counsel on problems dealing with liquid crystals. Some of the industrial contacts involve one-day consulting relationships with a company's research staff. The academic visitors were primarily interested in learning more about experimental techniques which they were intending to use in their own laboratory.

Faculty members associated with the Institute serve on university, collegial and departmental committees. Some of our staff members were involved in organizing seminars (local, national and international), and in community services such as P.T.A., Boy Scouts and church activities. Professor Brown continues to serve as chairman of the Planning and Steering
Committee for the International Conferences on Liquid Crystals. The last of these conferences was held in Stockholm, Sweden June 1974 with ten of our staff in attendance presenting 16 papers. The Planning and Steering Committee elected to hold the next International Liquid Crystal Conference at Kent State in 1976.

The Institute still holds a commanding position in the field of liquid crystal research. We have been approached by research groups in a number of foreign countries to interact more directly with the Institute in research programs of common interest. The barrier to this wholesome interaction is lack of financial resources to carry forth this international program.

This report shows the Liquid Crystal Institute to be an asset to Kent State University. Our future status in the field of liquid crystal research is limited only by lack of resources.

PERSONNEL

The list of the personnel identified with the Institute program during this report period is as follows:

2. Andrews, J.T.S. Research Associate
3. Bacon, W.E. Research Associate
4. de Vries, A. Senior Research Fellow
5. Doane, J.W. Associate Professor of Physics
6. Fishel, D.L. Professor of Chemistry
7. Franklin, W.M. Associate Professor of Physics (part time)
8. Gelerinter, E. Associate Professor of Physics
9. Golub, S. Assistant Professor of Physics
10. Johnson, D. Associate Professor of Physics
11. Kobayashi, K.K. Research Associate (part time)
12. Lesser, David Postdoctoral Fellow
13. Moroi, David Associate Professor of Physics
14. Neff, V.D. Associate Professor of Chemistry
15. Neubert, M. Postdoctoral Fellow
16. Parker, R. Postdoctoral Fellow (part time)
17. Piliavin, M. Postdoctoral Fellow (part time)
18. Saupe, A. Professor of Physics and Research Associate
19. Sengupta, P. Postdoctoral Fellow (part time)
20. Sheley, C. Assistant Professor of Chemistry (part time)
21. Uhrich, D. Associate Professor of Physics
22. Williams, L. Postdoctoral Fellow (part time)

The junior personnel include 10 graduate students pursuing degree work in Chemistry or Physics.

RESEARCH AREAS

Research areas in liquid crystals in which substantial progress has been made during the past year include (1) structure determination by x-ray methods; (2) synthesis of new compounds; (3) optical properties; (4) nuclear magnetic resonance; (5) Mössbauer effects; (6) calorimetry; (7) ultrasonic properties; (8) spin resonance; (9) reactions in liquid crystal media; (10) theoretical studies; (11) liquid crystals in living systems; and (12) light scattering.

EXTRAMURAL SUPPORT

During this report period the Institute has held one major research grant, GH34164X from the National Science Foundation. During the summer of 1974 the National Science Foundation extended the current grant through August 31. A new grant from NSF is to be made beginning September 1. We continue to use money from a Navy Research Laboratory grant, and from a gift of $5,000 to the Institute from Union Carbide. Dr. Doane's grant from the National Science Foundation is still active and Dr. Doane did spend a few weeks at the Jozef Stefan Institute carrying on this program.

LECTURES, PUBLICATIONS AND OTHER PROFESSIONAL ACTIVITIES

The Institute staff gave at least 60 lectures to scientific
audiences across the U.S. and in foreign countries. The lectures were presented at meetings of national scientific societies, international science meetings, departmental seminars in universities and in industrial laboratories. In addition to these individual lectures, Drs. Doane, Saupe and Brown participated in short courses on liquid crystals in foreign countries. Drs. Saupe and Brown gave a series of lectures in a short course presented at Macquaire University in Sydney, Australia and as part of the commemorative program recognizing the 25th Anniversary of the Founding of the Raman Institute. Drs. Doane and Brown gave lectures in a short course sponsored by the Jozef Stefan Institute in Ljubljana, Yugoslavia. In addition to these short courses Dr. Saupe gave lectures in German universities; Dr. de Vries lectured in France, Yugoslavia and the Netherlands; Dr. Brown lectured in Poland.

The publications in scientific journals in print and accepted for publication total at least 50. These papers were published in first-rate journals including the JOURNAL OF CHEMICAL PHYSICS, PHYSICAL REVIEWS, PHYSICAL REVIEW LETTERS, JOURNAL OF PHYSICAL CHEMISTRY and MOLECULAR CRYSTALS AND LIQUID CRYSTALS.

The staff members have refereed manuscripts for scientific journals and have evaluated research proposals for federal agencies and foundations. A final report under contract #F44620-69-C-0021 was written during this report period authored by nine senior people who served as principal investigators under the contract. The group also wrote a major proposal to the National Science Foundation. This proposal will be receiving
financial support from NSF. Individual research proposals were written.

It is a pleasure to report that Dr. Alfred Saupe was awarded the Nernst Prize which is administered by the German Society of Physical Chemistry. The award was given in recognition of Dr. Saupe's experimental and theoretical work in the application of liquid crystals to magnetic resonance spectroscopy. A number of our staff members hold offices in professional societies local, national and international.

INTERNATIONAL COOPERATION

The Institute has established itself on the international scene in several ways. We are continuing to interact as much as possible with research personnel in foreign countries. It is our hope and expectation that we can expand our interactions with research groups in France, Germany, Sweden, India, Yugoslavia and other European countries, including the Soviet Union. There is a strong interest among these research groups to interact more effectively with us than in the past. We are looking forward to continuing and expanding pleasant relations with these research groups from foreign countries.