TRAVELS NOW AND THEN

© Christopher Earls Brennen

INDIA 1980

INDIA

Mar.8 - Apr.11, 1980



via Graphnet

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CHRISTOPHER BRENNEN CALIFORNIA INSTITUTE OF TECHNOLOGY PASADENA CA 91125

MAPØØ81-Ø3 FURTHER OUR TODAYS TELEPHONE CONVERSATION AND IN VIEW PROJECT MANAGERS INSISTANCE THREE-WEEK MISSION REPEATING OUR OFFER CABLED YOUR HOME ADDRESS ON 11 FEBRUARY 1980 WITH NECESSARY REVISION: UNDER TERMS SPECIAL SERVICE AGREEMENT UNATIONS PLEASE OFFER YOU THREE-WEEK ASSIGNMENT AS CONSULTANT FOR RUTUDYNAMIC PUMPS TO COMMENCE 22 MARCH 1980 DUTY STATION PUNE INDIA. TERMS AGREEMENT PROVIDE LUMP SUM USDOLLARS FIVETHOUSAND TWOHUNDRED FIVE (5,250) GROSS. TWENTYFIVE PERCENT THIS AMOUNT PAYABLE WITHIN TWO/THREE WEEKS UNATIONS RECEIPT SIGNED AGREEMENT. BALANCE UPON CERTIFICATION BY DEPARTMENT TECHNICAL COOPERATION FOR DEVELOPMENT THAT ASSIGNMENT SATISFACTORILY PERFORMED AND FINAL REPORT SUBMITTED IN TEN COPIES. IN ADDITION YOU ENTITLED RECEIVE DAILY SUBSISTENCE ALLOWANCE WHILE ON OFFICIAL BUSINESS IN PUNE IN LOCAL CURRENCY WHICH CURRENTLY SET AT RUPEES TWOHUNDRED EIGHTTY (280) (EQUIVALENT USDOLLARS THIRTY SIX -- 36) SUBJECT CHANGE WITHOUT PRIOR NOTICE. UNATIONS PROVIDES ROUNDTRIP AIR ECONOMY CLASS TRAVEL MOST DIRECT WITHIN INDIA AS REQUIRED AND AUTHORIZED BY PROJECT.

PLEASE NOTE REMUNERATION OFFERED FOR THREE-WEEK ASSIGNMENT AND INCLUDES ELEMENT FOR PREPARATION AND SUBMISSION OF REPORT IN REQUISITE NUMBER OF COPIES. TRAVEL TIME TO BE COMPENSATED BY PERDIEM. TRAVEL AUTHORIZED/YOU BE CONTACTED BY THOMAS COOK AGENTS. PASSPORT WITH VISA WILL BE SENT AS SOON AS READY.

PLEASE CABLE SOONEST ACCEPTANCE ABOVE TERMS

(TREGGI UNITEDNATIONS NEWYORK)

;ø3Ø21625

NNNN

CONSENT FOR TRAVEL IMMUNIZATIONS

California Institute of Technology Pasadena, California 91125

Immunizations for international travel are provided to protect against certain diseases to which you may be exposed and to satisfy entry requirements of various nations. In many instances these requirements are to prevent your bringing a disease into the country.

The diseases against which you may need protection are Cholera, Hepatitis-Type A ("Infectious Hepatitis"), Smallpox, Typhoid Fever. (Plague and Yellow Fever immunizations are available at Pasadena Health Department on Wednesdays between 2 & 4, by appointment.)



Cholera vaccine is made with killed organisms. It is about 50% effective but will usually provide at least partial protection. It does not prevent transmission of the disease. Side effects may include discomfort at the injection site for 1-2 days, mild fever, headache and tiredness.

Immune Serum Globulin contains antibodies from the blood of people who have had Type A Hepatitis. It is 80%-90% effective in preventing the disease when given prior to exposure. The protection lasts for 3-6 months. You may experience discomfort at the injection site.

Smallpox vaccine is made with a modified live virus of a similar disease. It provides a high degree of protection following a successful "take" which persists for at least three years in healthy persons. There are risks which include encephalitis (brain fever) or a severe generalized reaction occurring once per 1,000,000 vaccinations, a generalized skin eruption occurring once per 100,000 vaccinations or very rarely a fatal reaction. You may expect redness, itching, swelling and one or more small blisters or pustules at the site of vaccination.

Typhoid Fever vaccine is made with killed organisms. It is 70%-90% effective for up to 3 years. Side effects usually include fever which may require aspirin; headache; tiredness and muscle discomfort; and, soreness at the injection site.

CONSENT

I have read the above statement regarding immunizations for international travel and understand the risks and benefits of these vaccines. I request that I be given the appropriate immunization for (circle appropriate diseases) Cholera Hepatitis-Type A Smallpox Typhoid Fever

Signature of person receiving immunization

FEB 4 1980

Date

X Yha

10/17/78

) .77/A (3-71) - E.

UNITED NATIONS UNIES

NEW YORK

Nationality: USA

SPECIAL SERVICE AGREEMENT

Index No.: 238 978

Ca

(Expert on Mission)

	MEMORANDUM OF AGREEMENT MADE THIS 15th day of April 1980, between the United
Nati	ons and Mr. Christopher BRENNEN (hereinafter referred to as the "subscriber") whose
addr	ess is 360 Olive Tree Lane - Sierra Madre, Ca. 91024 (USA)
	WHEREAS the United Nations desires to engage the services of the subscriber on the terms and conditions inafter set forth, and
the	WHEREAS the subscriber is ready and willing to accept this engagement of service with the United Nations on said terms and conditions,
	NOW, THEREFORE, the parties hereto hereby agree as follows:
1.	NATURE OF SERVICES Consultant for Rotodynamic Pumps
	The subscriber shall perform the following services according to the following schedule:
wi	As Consultant with Project IND/73/042 - Hydromechanics Division, the Subscriber .11 perform the duties outlined in the attached job description.
th	The Subscriber will submit a final report, in ten copies, at the end of his signment. The compensation offered includes the preparation and submission of me report. The report should be completed within the period outlined in paragraph below.
un	Three weeks, plus established travel time, within DURATION OF AGREEMENT This agreement shall commence on the 15th day of March 1980, and shall expire on the tisfactory completion of the services described above, but not later than the 15th day of April 1980, terminated under the terms of this agreement. Either party may terminate this agreement at any time by less sooner terminated under the terms of this agreement. Either party may terminate this agreement at any time by less than the content of the sooner terminated under the terms of this agreement. Either party may terminate this agreement at any time by less than the content party ————————————————————————————————————
co	In the event of this agreement being terminated prior to its due expiration date, the subscriber shall be impensated for the actual amount of work performed to the satisfaction of the United Nations on a pro rata basis.
3.	CONSIDERATION (41) a green the United
	As full consideration for the services performed by the subscriber under the terms of this agreement, the United
St by th sa Su on rc (U	ARRESTMENTS BAYABLE ARRESTMENTS BAYABLE ARRESTMENTS BAYABLE B
N	IOTE: The subscriber will be responsible for any taxes due on the remuneration and as a consequence, no statement of earnings will be issued by the United Nations to the subscriber.

4. STATUS OF THE SUBSCRIBER

The subscriber shall be considered as having the legal status of an Expert on Mission for the purposes of the Convention on the Privileges and Immunities of the United Nations. The subscriber shall not be considered in any respect as being a staff member of the United Nations.

5. RIGHTS AND OBLIGATIONS OF THE SUBSCRIBER

The rights and obligations of the subscriber are strictly limited to the terms and conditions of this agreement. Accordingly, the subscriber shall not be entitled to any benefit, payment, subsidy, compensation or entitlement, except as expressly provided in this agreement. In the event of death, injury or illness attributable to the performance of services on behalf of the United Nations under the terms of this agreement, the subscriber shall be entitled to compensation equivalent to the compensation which would be payable under Appendix D to the Staff Rules to a staff member of the United Nations of similar rank, but not higher than the rank of Director.

6. TITLE RIGHTS

The title rights, copyrights, and all other rights of whatsoever nature in any material produced under the provisions of this agreement shall be vested exclusively in the United Nations.

7. UNPUBLISHED INFORMATION

The subscriber shall not communicate to any person or other entity any unpublished information made known to him by the United Nations in the course of performing his obligations under the terms of this agreement except upon authorization by the United Nations.

(Subscriber)
Christopher Brennen
BANKING INSTRUCTIONS:

(To be completed by the Subscriber)

IN WITNESS WHEREOF, the parties hereto have executed this agreement.

UNITED NA

By-

Steven Halevy, Deputy Chief, AS/TCD

6

By:

(Office to k Recognite it

Gian Carlo Treggi, TARS/TCD

Allot. Acct. No.: IP-IND-3-042-1102-04-

Post key code: IND-150-3-042-03-X

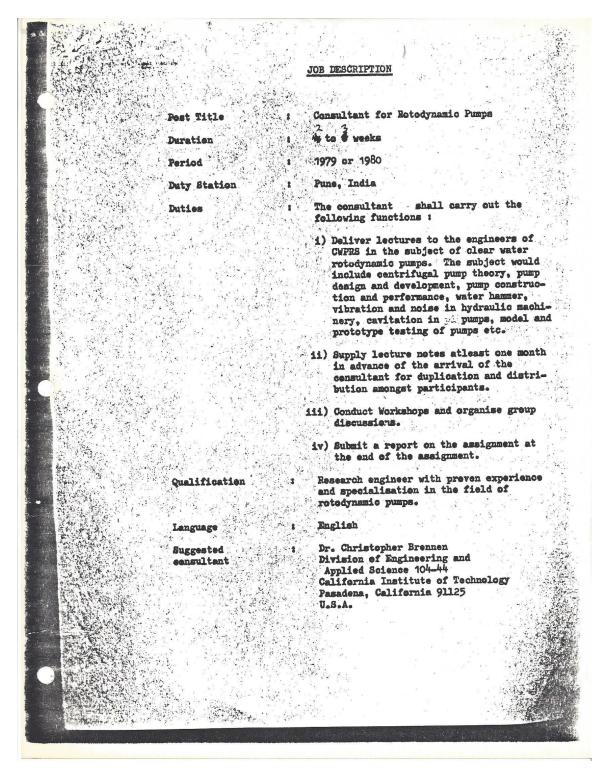
Project Symbol: IND/73/042

M.O.D.:

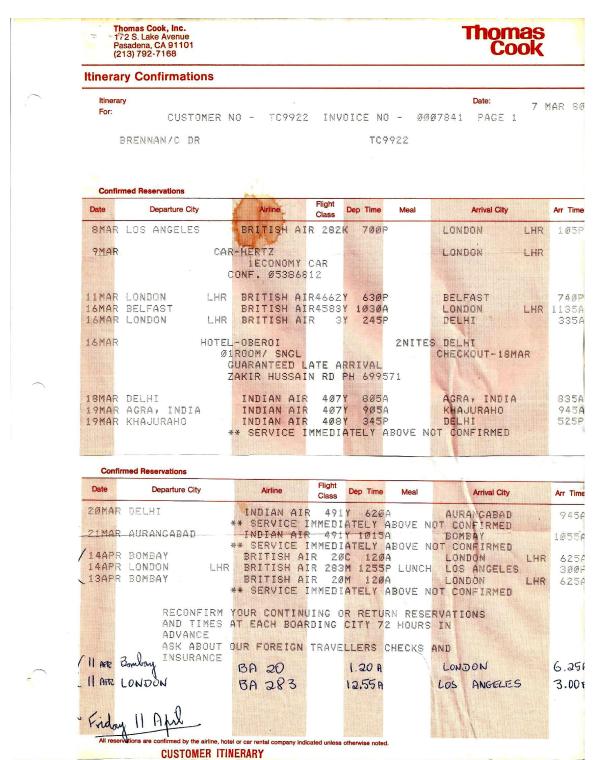
0-29-8660

TCD/PMO: Mrs. S. Bartolo

J. Gallina



	CALIFORNIA INSTITUTE OF TECHNOLOGY SHEET SHEET
Ilmean	
Itinerary C	Brennen
	Marl 8. Bitial Armays BA 282
	ambridge, England. Contact: Dept. of Appl. Math. Theoretical Alypus, Cambridge
	Northern Irland; # Facuto: Magle afelt 2311 7
March 16->21	M. M. W. M. BRENNEN, MAGHE CO. DERRY, N. IRELAN
March 16, 17	Uberoi Intercontinental, Delhi
March 18->21	En voite to Poora
Mark 21 -> Afril	Hotel Blue Diamond, Foona II, KOREGAON ROAD, POONA-I, IND Telephone: 28735 Central Water and Force Research Station P.O. KHADAKWASLA Research Station, POONA - 411024 India
	Telex: PN 0145-390
	Telex: PN 0145-390
	Telephones: 445550-51-5
	44 5203,445 60 445806,445 65
	445806,44565



March 8, 1980

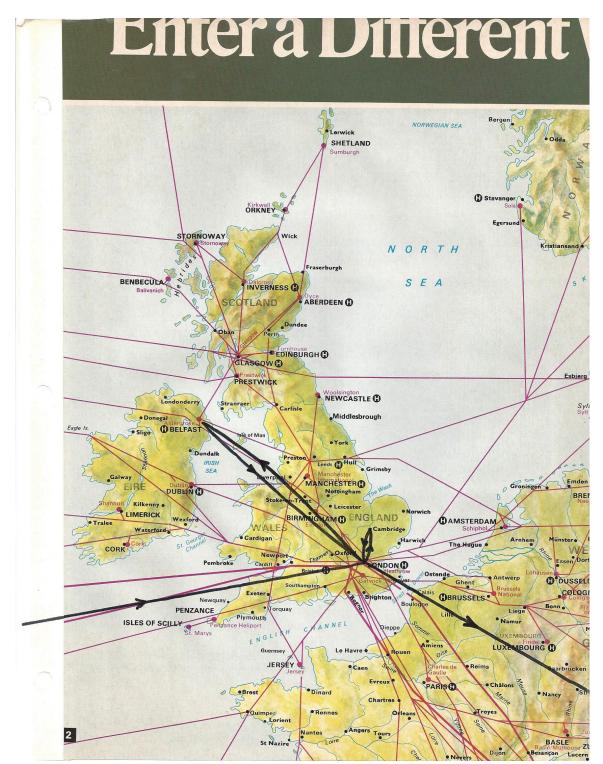
Flight from Los Angeles to London, BA282, left 7.0pm arrived 1.05pm

March 9, 1980

Arrive London at 1.05pm Rented Hertz car

March 11, 1980

Flight from London to Belfast, BA4662, left 6.30pm arrive 7.40pm.







Northern Ireland





Northern Ireland





Northern Ireland





Northern Ireland

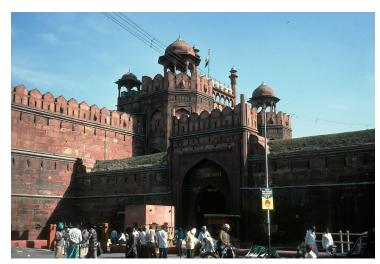




Northern Ireland

March 11, 1980 Flight from Belfast to London, BA4583, left 10.30am arrive 11.35am. Flight from London to Delhi, BA3, left 2.45pm arrive 3.35am.

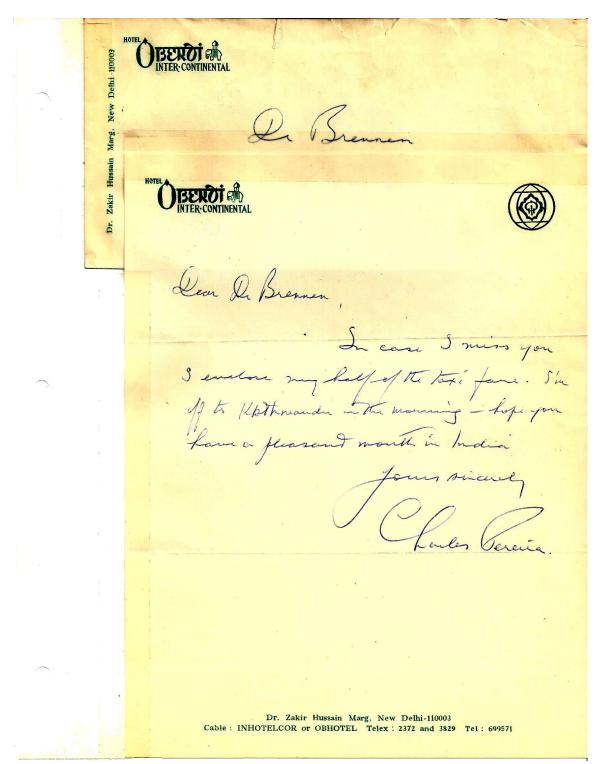
SUNDAY MARCH 16 Seft Maghenfelt very larly and of returned the ental car to Hertz at airfort - nor mention of Mais dent in the front bumper. Seft on 10.30 flight to Sordon - at Sordon sirport sent loost minute postcards and then caught British Airways flight BA3 to Delhi on time at 2.45 pm. Univertial flight of 8½ hours - passed over Tehranmet Dr. Peter Akers (U.K.) on flight - he was on his way to a conference at Rorkee - axid Sasena would be there. Monday, MARCH 17 St. Patricko day! Arrived in Delhi more or less on Time at 4.00 pm - took time to clear passpot control, baggage alled customs - at customs I met Sir Charles Ferrera (?) who was also on his way to the Oberon Intercontinental litel so we get a taxi together - I had to pay for it since he had not yet obtained ruples - he repaid the by letter the next morning - On the cab ride I noted smell, chaos and crasy driving. At Oberon found a nice hotel and went straight to hed. Did not make until 1.30 pm - up - lunch and took taxi to Fed Fort - spirit & interesting but not like subsequent places, faid quide - then lake returned to taxi and went to HIMAYUN'S TELMB - also only quite interesting At \$6 both places to use accosted by many street vendors still learning how to say no - but learning flot. Taxi had
to be push Itated at HIMAYUN'S tomb - I then back to
Obersi for meal. Went for stroll outside afterwards - shoe
sline body with portable but approached me. Somehow managed
to sayint much on \$6 my shoet don't benow quite how he
did it without my sking - their invisited on cleaning them
- managed to brook laces - then charged me about \$1.50 for new laces + cleaning job - quite a con job. In the

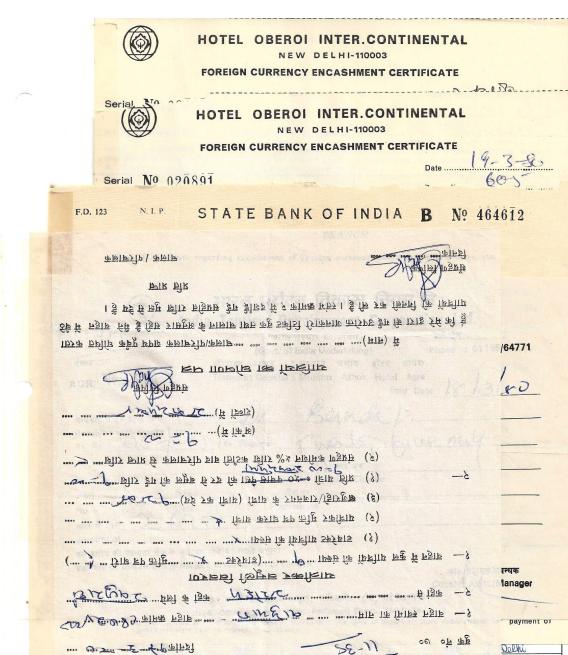






Himayun's Tomb, Delhi

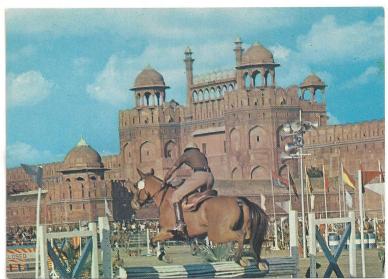




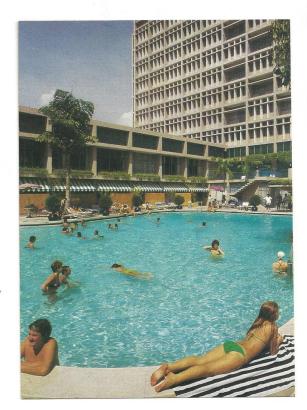
(ок он) जिल्लास-शक्ति-हिन-शक्ति एकोशक

पात्रीकर संग्रहण कार्यालय "225

file:///C/Files/BOOKS/TRAVELS/travels/travindia80.htm[3/21/2021 5:41:15 PM]



RED FORT, DELHI



oberoi -Intercont. Delhi



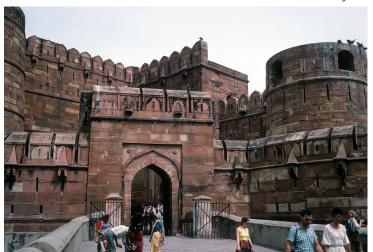


Taj Mahal, Agra





Taj Mahal, Agra





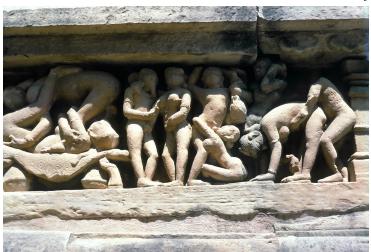
Red Fort, Agra

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	livening I interesting	went to Indian de ind impressive	ancing on	of of con	beroi - m	ost
FRCH -	night Fin	ed to go to sleep but ally got up at a large to sirport - just	to no au 5.00 am. bases with t my brief	rail - st and bad to the lef fease alor	and awa breakfas the luggage ig. Con	ke e et. e su
	Indian An lut did not was Juli best hotel	lines light IC 4 leave tillo 9.0 At Agra took t I started in -	07 - any 00 AM - N axis to N very attra	osed to lea short of 1UGHAL clive - st	ve at 8.0 light to P Shevator I markle	1GR n h insin
	(is tree presi	HT MANN (?) from dent) of Union Co MUGHAL - had	I hunch	ricultural S	Parision -	ala
	- spent alon Red Fort lunch - pt 4.30 PM.	I coffee I set off it I hours there impressive also used around a bit	then - finall and the	ly seos ly back n went to	ter cal to to hotel	T for aboi
	WEDNESDAY,	MARCH 19				
	Wol	re about 2.00 A	m - dozec	l and rea	d until 9	5 -
	then up to	watch dawn to amell and a mell and a mell and a mother India and off to an supposed to go to (BENARES) first a forwhere - primitive on the splemoon by iting list. Howe	me up)	from balco	ing with	viei
	flight out.	howher - primitive in the afternoon be iting list. Howe w. # Well kept.	at was inf wer took	omed I taxi to	main	r.11





Khajuraho





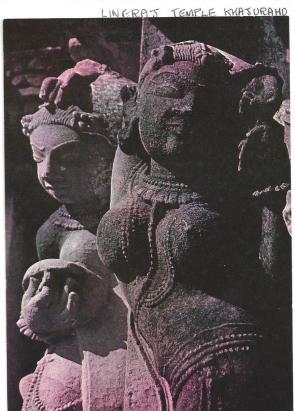
Khajuraho



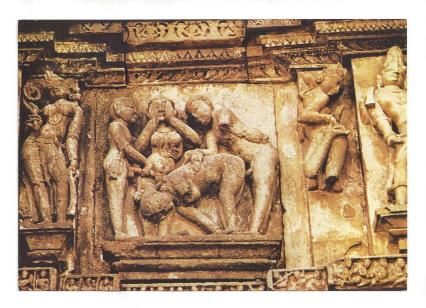
Khajuraho

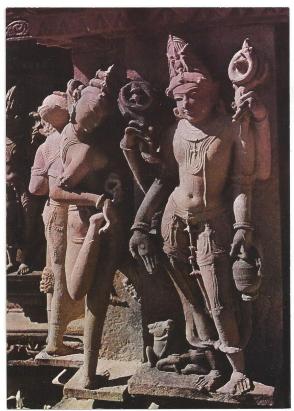
(3) the effort of getting to this out of the way place. The temples and covered in carrings of human at north war and play. They are totally uninhibited sexually. Sculptures deficted the most vivid and explicit acenes of intercourse not only with humans. There are about five major temples, all on vaised platforms and many minor temples. Took a great many pictures and spoint about 2 hours there. The taxin to another group of temples - the Eastern group - which included JAIN temples - not so interesting. Then to a hotel for bunch (late) and finally to airfort to try and get on the only plane leaving that jurals that day in westerly direction (only other one was the one I came in on). After great braggle everyone at the last minute made flight areat hasse everyone at the last minus Princes Pights were) IC 408 (another 737 as all Indian Arlines Pights were) 6.00 PM. Taxi directly to Oberoi where I picked up my luggage, had dinner and went to aleep about 9.00 cm. THURSDAY, MARCH 20 WEDNESDAY, MARCH 19 Up quickly at about 4:00 Am, breakfast, checked out Flight 491 was full! No and took taxa to laipat. Flight 491 was full! No seats left the man said - adamant. At the last minute after much pleading I presented my U.N. Fassfort and he finally relented - I was only one to manage it. Plight 491 landed in Jaiper Odiaper and then as usual it went to off-course - landed in Bombay before backtrocking to Aurangabad. Arrived about 11.30 Am and went to the RAMA International latel - O.K. - checked in and had something to eat. Then off to ELLOTER by taxi. Fanastic temples carved out of at mountain - some 34 in number - visited the main ones - the the Number 10,12 (Buddhit), 16, 21 (Hindu) and 32 (JAIN) No. 16 - the Kailasa Temple is also absolutely amazing. It was hat but I spent about 3 hours there - v. Las tired afterwards. Then taxi back to

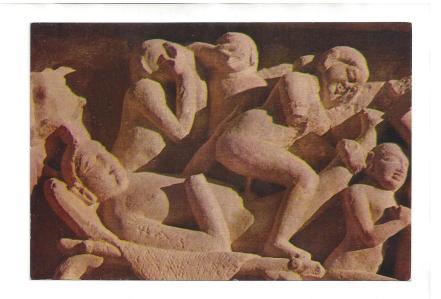


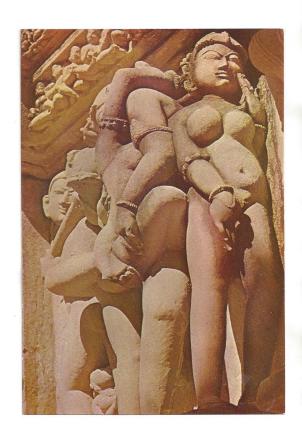


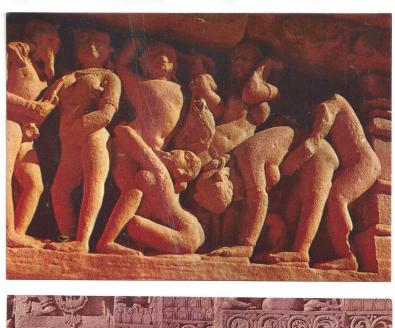
SCULPTURE KHAJURAHO















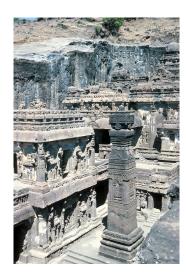


Ellora





Ellora





Ellora



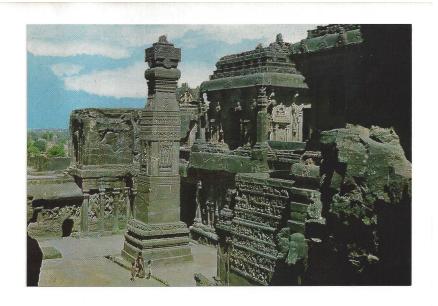


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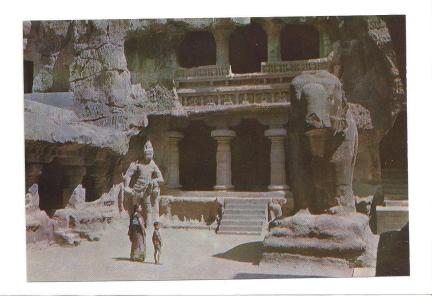


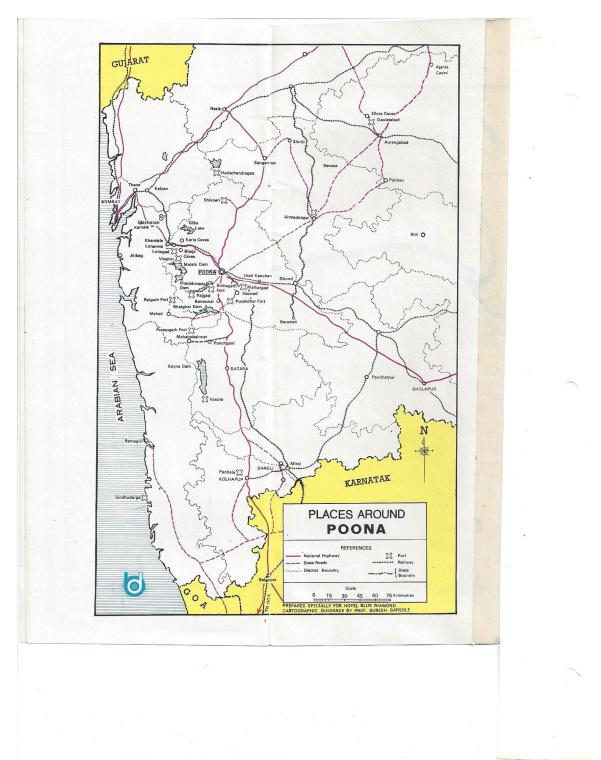
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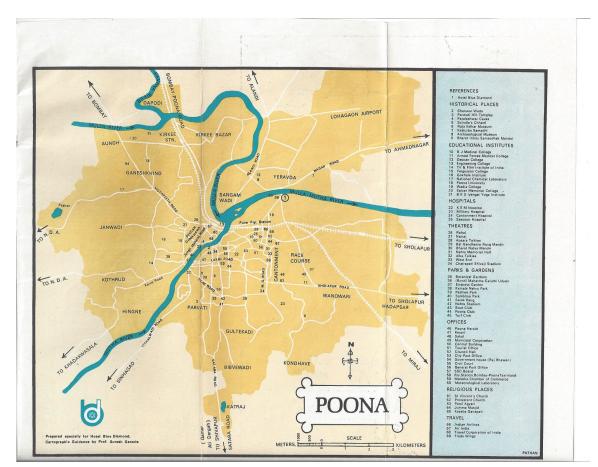
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sleep by	shout 9.00pm.	0	
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Tuber			
INURSD FRIDAY	, MARCH 21		
FRIDHT) WITHCOTT OUT		
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trouble a	etting on leight to	Bombay - Ic	- 491 - left.
11.00 8	etting on Phialit to nd set to Bomb - first on approace	long airport about	11.30. Donl
aipot -	- list on approace	h tolanding or	re has the most
wirld a	iew of great exha	uses of the m	ost awful sly
- then t	the airport is che	of chaotic - a	Carl 45 min. bef
luggage	ren of great esta the airport is che arrives. The	1 I took a to	axi to dountou
Blombay	to the Entish	Tirrays office	and Changed
my vou	in thatis to Him	WII. Italia	Rivoca O Ad
Victoria	Hailway Elation	andran is	28 at . B DOto
freque -	people seleping is	venjurier - remus	e sundo. Fifter
much to	rouble I finally m	raviaged to get	a first-class
ticket &	Roilvay Station people sleeping Re ouble I linally on to six down on to	Deccan Queen	and Lound
a place	to sit down on t	the platform to	dvait out the
d'a hou	vo lactor will warn	lest. I only	mas good w
me -	manned to set	me a reserved	shal and the
Toale 1	at 5.20 Pm . T	agin John Mas	and to bear
- Olimbe	ed up onto the 8	Decan and an	wed in Pune
about	8.30 pm.		

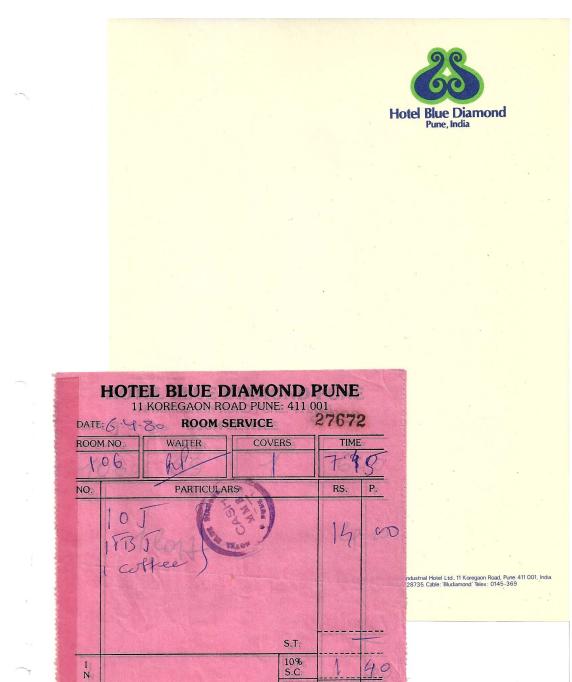


ELLORA CAVES (NR. AURANGBAD)









TOTAL

GUEST SIGNATURE





Blue Diamond Hotel, Pune, India





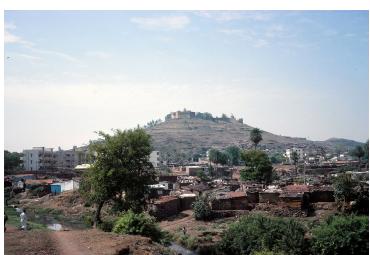
Pune, India





Pune, India

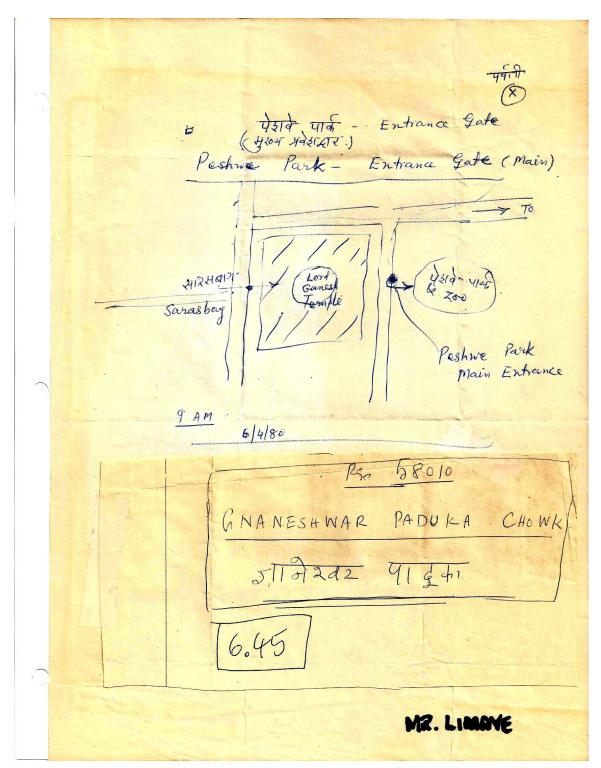




Pune, India



Pune, India







CWPRS, Khadakwasla, India





CWPRS, Khadakwasla, India





CWPRS, Khadakwasla, India



CWPRS, Khadakwasla, India



SITTING: (Left to Right)

1) M.M.Kali, Chief Research Officer (II)

2) Mr. V.S. Limaye, (.R.O. (II)

3) Mr. C.P. Venkatraman, C.R.O. (I)

4) Dr. C. Brennan, UN. Consultant.

5) Dr. B. Pant, Additional Director

6) Mr. J. H. Shankarrao, C.R.O. (I)

7) Mr. R.P. Athawale, (.R.O. (I)

STANDING:- (Left to Right)

1) G.S. Rao, Assistant Research Officer.

2) S.R. Bhambure, Research Officer

3) BS. Kulkarni, R.O.

4) A.M. Dotor , Research Asst.

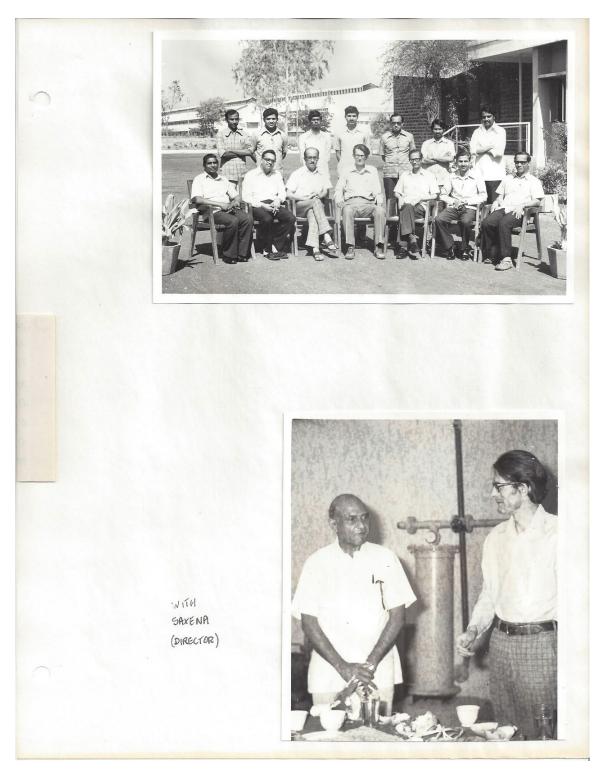
8) Mr. M.N. Ramakrishna Rao , C.R.O. (II)

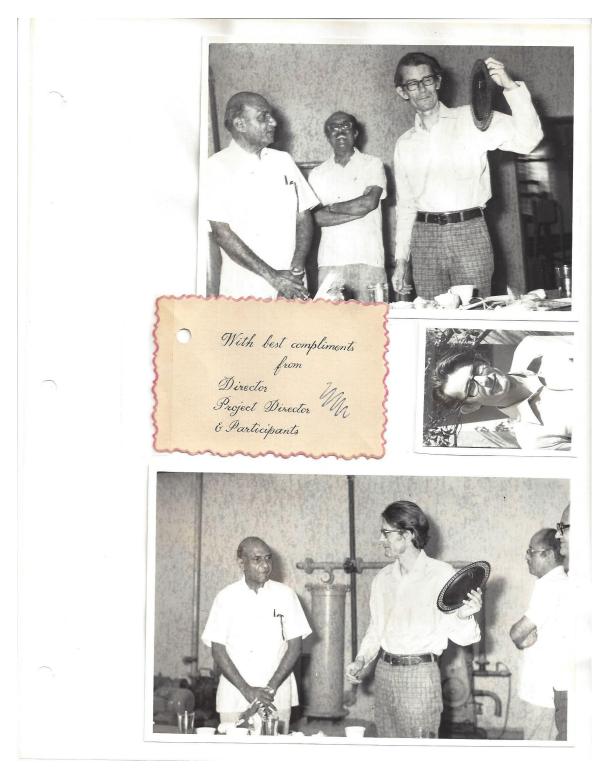
61 M.B. Kashid, R.O.

7) A. R. Chavan, . R.O.

SAXENA (DIRECTOR)





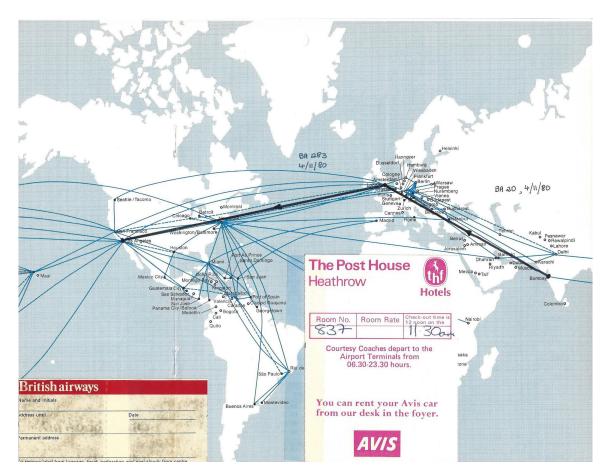


April 10, 1980

Flight from Pune to Bombay, left 7.20pm arrived 8.00pm

April 11, 1980

Flight from Bombay to London, BA20 left 1.20am arrive London at 6.25am Spent a few hours in Post House hotel, Heathrow airport Flight from London to Los Angeles, BA283 left 12.55pm arrive Los Angeles at 3.00pm



UNITED NATIONS DEVELOPMENT PROGRAMME



विकास कायेक्रम

445550 - 51 - 52

UN/UNDP PROJECTS AT CENTRAL WATER & POWER RESEARCH STATION

CABLE: CEWAPORES, POONA TELEX: PN 0145 — 390

445203, 445604 445806, 445652

445268, 445282

445287.

Reference :

IND/73/042/3-CB

P.O. Khadakwasla Research Station, Poona - 411 024, India.

9 April 1980

Dear Prof. Brennen,

I am writing this letter to express my thanks to you for having come to the Project and given us an opportunity to share your experience in the field of Rotodynamic Pumps. Your lectures to and discussions with the Project staff have been extremely useful.

Permit me to say that we enjoyed having you amongst us. I hope you also enjoyed your stay with the Project.

With kind regards,

Yours sincerely,

P.C. Saxena Director

Prof. C. Brennen UN Consultant Camp: Pune

TELEX : CEWAPORE PN-390 GRAM : CEWAPORES

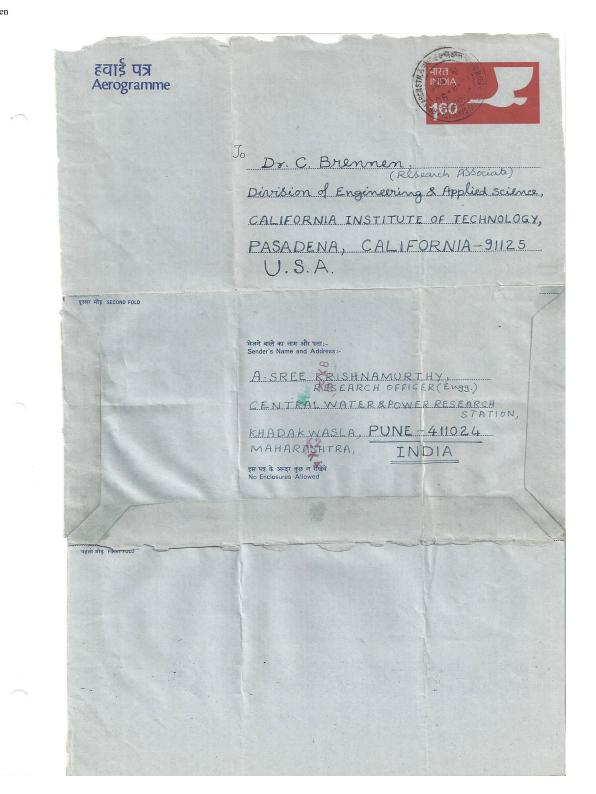
TEL: OFFICE: 54241-47 RES.: 57938

P. C. SAXENA, M.Sc. D. I.I. Sc. F. I. E. (India)

Director

Central Water & Power Research Station

KHADAKWASLA PUNE (POONA) 411 024 INDIA



Pune, 12-5-1980. Respected Sir, I am in receipt of honeycomb specimen and published material sent to me as promised by you I gratefally acknowledge your affection to bring me up in my career by promptly responding to my request at your earliest convenience. This highly praiseworthy help of yours encourages me to pursue my work more vigorously than before and overcome any distacles that I may to encounter in future. At present, mechanical design of individual components is in progress. I shall make are of your help whenever it is required without hisistation. With best wishes, Truly yours, Arel (A. SREE KRISHNAMURTHY) Jo Dr. C. Brennen, California Institute of Technology, California -91125. U.S.A.

360 Olive Tree Lane Sierra Madre, CA 91024

April 15, 1980

Mr. G.C. Treggi Technical Assistance Recruitment Service United Nations New York, N.Y. 10017

Dear Mr. Treggi:

I have now successfully completed my mission as a UnN. Consultant to CWPRS, Pune, India (IND-150-3-042-03-X). A written report on my mission was completed during my final days at CWPRS and was approved by the people there. I enclose a copy for you.

I am now writing to you to request that you expedite payment to me of the agreed \$5250.00 fee for this mission. I was somewhat disheartened by the fact that a formal contract was not sent to my home during my absence. However, I trust that you will expedite the agreement as spelled out in the telegram as soon as possible.

Yours sincerely,

Christopher E. Brennen

CEB:bh encl

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360 Olive Tree Lane Sierra Madre, CA 91024

April 15, 1980

Ms. Halkias
Administrative Section
Office of Technical Cooperation
United Nations
New York, N.Y. 10017

Dear Ms. Halkias:

I have now completed my mission as a UnN. Consultant to Central Water & Power Research Station in Pune, India (IND-150-3-042-03-X).

I therefore enclose a claim for incidental travel expenses with receipts. In addition to these expenses I expect to receive per diem for the travel time. Since the travel time from Pasadena to Pune exceeds 30 hours I expect to receive 3 days per diem for the outgoing journey, but only 2 days for the return journey since only a brief stopover was made during the return. Hence the additional per diem would be 5 days.

Finally, I also enclose the ticket stubs (two). These tickets were provided to me by the U.N.

Please mail the remuneration for expenses to me at the above address.

Yours sincerely,

Christopher E. Brennen

CB:bh encl

UNITED NATIONS



NATIONS UNIES

POSTAL ADDRESS -- ADRESSE POSTALE: UNITED NATIONS, N.Y. 10017

CABLE ADDRESS -- ADRESSE TELEGRAPHIQUE: UNATIONS NEWYORK

REFERENCE: PRU-80

BRENNEN, Christopher

8 May 1980

Dear Mr. Brennen:

I acknowledge receipt of your claim dated

15 April 1980

for reimbursement of expenses in respect of travel to Poona, India.

(21 March-10 April 1980)

Your claim has been processed and forwarded to the Accounts Division, Office of Financial Services, for auditing and payment. The Accounts Division will notify you directly as soon as payment of the amount due to you in this respect is made.

Yours sincerely, Parris Halkias Admin. Officer

Administrative Section
Department of Technical Co-operation
for Development

Mr. Christopher Brennen 360 Olive Tree Lane Sierra Madre, California 91024 USA

TCD.98 (10-79)

Back to table of contents

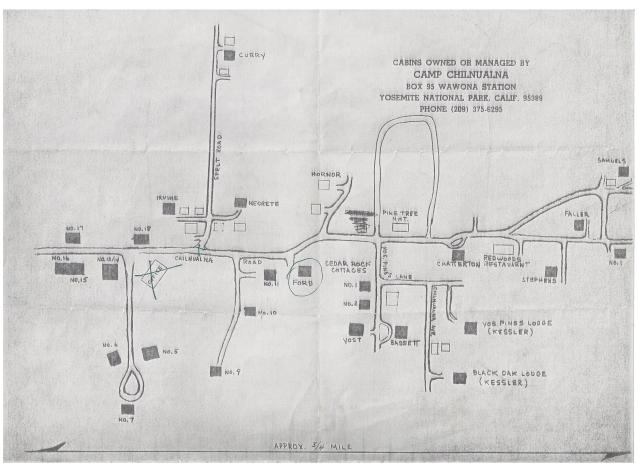
Last updated 7/30/99. Christopher E. Brennen

TRAVELS NOW AND THEN

© Christopher Earls Brennen

YOSEMITE 1980

Cabin Rental at Wawona, Yosemite National Park



Camp Chilnualna Map, Ford Cabin circled





Ford Cabin, Wawona, Yosemite National Park





Ford Cabin, Wawona, Yosemite National Park





Swimming near Wawona, Yosemite National Park





Swimming near Wawona, Yosemite National Park





Swimming near Wawona, Yosemite National Park





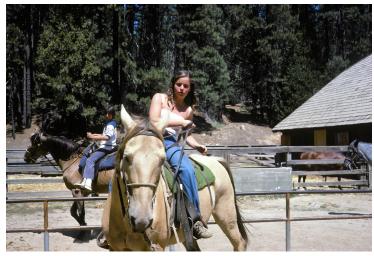
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Yosemite National Park





Yosemite National Park



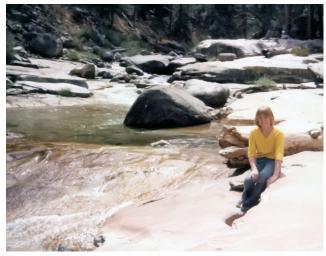


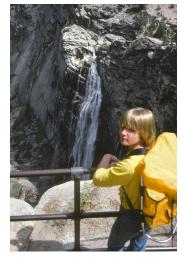
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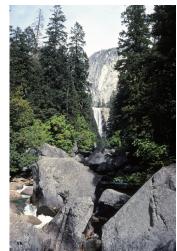
Yosemite National Park





Yosemite National Park





Yosemite National Park





Yosemite National Park

Back to table of contents

Last updated 7/30/99. Christopher E. Brennen IV. The Grand Finale
 "Let's Advance on Science"
 (by Kent Clark and Elliott Davis;
 originally written for a 1955 meeting
 of the AAAS, recycled in 1975 for
 "Beautiful Beckman")
 Audience, Cheerleaders, Cast, and Crew:

Let's advance on science before it advances on us Let's not leave it where we find it While we push it forward let's stay way behind it Onward with caution, forward with finesse Don't delay just join today with the AAAS, Bravo.

AAAS AAAS

Let's advance on science before it advances on us No use hiding let's take action Don't let research problems drive us to distraction Monographs waving, on and on we press No dismay we'll find a way, with the AAAS, right on

AAAS AAAS

Let's advance on science before it advances on us
Though the whole wide world may fear us
When they understand us everyone will cheer us
Onward to Stockholm, on to happiness
Night and day we'll kneel and pray for the AAAAAAAAA Huzzah.

Skits Originally Written by
Mildred Goldberger
Enlarged Upon by the Players Themselves

First Performed by the IAC and Assorted Hangers-on for the Board of Trustees Meeting in October

THE FIRST ANNUAL FACULTY NON-DISCUSSION MEETING

November 22, 1980, 9:00 p.m. The Athenaeum

The Faculty Players Present

"THE AGENDA"
10:00 p.m.

Chairman for the Evening

Jim Morgan

At the Piano Gary Lorden

Produced and Directed by Mildred Goldberger
Directed and Produced by Alice Stone
Instigated by David Goodstein
Sound and Lights by Don Delson, Public Events

- I. The Athenaeum Palace Movie Theatre

 A. "The Great Discovery"

 (An Undiscovered Silent Movie

 Masterpiece)

 Jerry Wasserburg as Harry Gray

 Anne Vaughan as Shirley

 Ned Munger as The Villain

 Bob Howard as The Division Chairman

 David Goodstein and Roger Noll

 as Policemen

 (Chemical razzle-dazzle

 by the real Harry Gray)
 - B. "The Saga of the Yukon"

 (Another Undiscovered . . .)

 John Dick as The Kid

 Linda Kamb as Lady Linda

 Art Vaughan as The Bartender

 Lee DuBridge as The Messenger

 Chris Brennen as Luke Plumber

 Roger Noll and David Goodstein as

 Men in the Bar

Director of the Athenaeum Palace Movie Theatre

Mildred Goldberger

- II. Love at Caltech
 - A. "Monahan's Pub"
 David Goodstein as The Student
 Roger Noll as The Man About Town
 Robyn Noll as The Young Thing
 Linda Kamb as The Barmaid
 - B. "The Athenaeum Library"
 Art Vaughan as The Professor
 Anne Vaughan as The Lady
 Chris Brennen as The Waiter
 - C. "What's a Nice Girl Like You Doing in a Place Like This!?"
 (by Kent Clark and Elliott Davis, from "Beautiful Beckman," 1975)
 Greta Davidson as The Chanteuse John Dick and Chris Brennen as Chorus Boys
 John Davidson on Guitar
- D. "Palomar"

 Molly Howard as Mrs. Burbidge

 Bob Howard as Mr. Burbidge
- III. "The 3,000 Year Old Woman"
 Judy Goodstein as The Woman
 Anne Paul as Barbara Walters
 Linda Kamb and Robyn Noll as
 The Cheerleaders

(turn the page for THE GRAND FINALE!)

At the Technical Sessions

Basic Engineering

Ad Hoc Models for an Insecure Science

There is new technology emerging in the field of fluids engineering, resulting from an increasing involvement with flow systems characterized by two or more separate phases. Complex two-phase flows are an important concern of both conventional and alternative energy systems. Watersteam systems, combustion systems with gas-particulate components, solid fuel transportation systems using solid-liquid slurries, and fluidized bed systems are all based on polyphase flows. Highlighting this interest, the ETC featured a Fluids Symposium on Polyphase Transport Technology.

Gas-Liquid Flows. At the initial invited paper session, G.B. Wallis of Dartmouth College concluded that many aspects of the science of twophase gas-liquid flow are insecure. We need, he said, to be wary of excessive expectations of analysis to predict flow behavior. The experimental base is very meager and will probably always be small compared with the immense variety of possible phenomena. Wallis reported that the present active area of theoretical development involves the separated flow model which has the potential of representing quite a few practical situations - as long as one does not invest it with more general authority than it deserves. There may be some spectacular successes for it in the future, particularly in its three-dimensional form. The reason: Modern computer technology will make it possible to handle all the simultaneous equations involved.

According to Wallis, there will have to be some improved methods of experimentation evolved concurrently if the theory is to be supported by a thorough test of its pieces and not by just some overall predictions of the system. His view of the field is that the "ad hoc" approach is likely to retain its preeminence as the dominant method of analysis in the foreseeable future. It is not realistic to expect there ever to exist a rigorous base of general twophase flow theory that can be taught with the authority of the Navier-Stokes equation. What we are going to have, he concluded, is an "evolving bag of tricks" that must be used with skill, judgment, and the realistic awareness of their limitations as well as their potential of saving us from both being doomed to learn everything by experience and starting each new problem from scratch.

Turbomachinery. C.E. Brennen of the California Institute of Technology, speaking as an invited lecturer at the same session, discussed polyphase flow in turbomachines. He agreed with Wallis that ad hoc models would best provide the solutions of polyphase flow problems, particularly in turbomachinery. He predicted a gradual increase in the understanding of such flows through many more observations and the development of theoretical ad hoc models. Brennen divided the problems associated with polyphase flows in turbomachines into three categories. First, there are those associated with material damage to the machine — ranging from erosion to cavitation. In the second category he placed problems concerned with steady-state performance. Here, he said, it is becoming clear that a better understanding of the different types of flow and of the loading conditions is a prerequisite. The third category of problems he described involved frequent instabilities and oscillatory flows.

Laser-Doppler Measurements Improved. In order to study two-phase flows properly it is necessary to be able to accurately measure and describe such particulate flow systems. As a keynote paper presentation, F. Durst of Karlsruhe University, West Germany, reviewed his latest work in making such measurements using Laser-Doppler techniques. In systems in which spherical particles are suspended, he has been able to measure instantaneous velocity of the flowing fluid, the instantaneous velocity of suspended particles, the size distribution of suspended particles, and the concentration of suspended particles. Durst reviewed the application of Laser-Doppler anemometers to particulate flow systems. He described a two-part optical system that could, for correct measurements, separate information from the fluid velocity field from that relating to the properties of the moving particles. Electronic processing techniques are used to extract the information from the system.

Models for Gas-Particle Flows. At the



Keynote speaker Graham Wallis, of Dartmouth College, N.H., received an ASME Centennial Medal for his review of theoretical models of gas-liquid flows.



After lecturing on two-phase flow problems in turbomachines Christopher Brennen of Cal Tech received an ASME Centennial Medal

same session, C. Crowe of Washington State University, Pullman, Wash., described the latest developments in numerical models for gas-particle (or droplet) flows. The particle phase, he pointed out, is dependent on the relative effects of aerodynamic forces and

ME 19 abc

Fluid Mechanics and Gasdynamics T. Acosta, C. Brennen

9 units (3-0-6); first, second, third terms third term survey

responses recieved: 17

lecture attendance mean: 86% st.dev: 22% homework completed mean: 99% st.dev: 2%

hours per week spent on this course:

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clari	ty	0	3	3	2	2	7	0	0	4.4	
workl	oad	0	0	1	15	1	0	0	0	4.0	
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valua	ble	0	1	2	1	6	4	3	0	5.1	

required yes: 10 no: 7 grades: A:5 B:5 C:1

options: AMa:1 Eng:11 ME:5

10 comments

Acosta acted indifferent in class and was rather sloppy with his boardwork and homework sets. His substitute, Brennen, was very good. One person thought there should be a text. (JNG)

National Aeronautics and Space Administration

George C. Marshall Space Flight Center Marshall Space Flight Center, Alabama 35812



JUN 16 1980

Reply to Attn of:

AT01

C. E. Brennen
Department of Engineering
California Institute of Technology
Pasadena, CA 91125

Subject: Your Reported Invention/New Technology - MFS-25399

We appreciate your support of NASA's Technology Utilization efforts in the form of your recent new technology report. The new technology you have identified and reported adds to our store of new aerospace-related innovations available for application in other public and private endeavors.

The innovation has been selected for publication. Enclosed for your information is NASA Form 1370, New Technology Evaluation and Disposition Transcript.

Since you will receive within the next year a monetary award of \$50 for this innovation, your <u>social security number</u> and <u>home address</u> must be provided to the NASA Inventions and Contributions Board in preparing your check. To provide this information, I have enclosed a form and franked envelope. The providing of this information is authorized by Executive Order 9397, dated November 27, 1943.

The reporting and dissemination of new technology from our national aerospace program is important to NASA and to the nation. We look forward to your continued contributions to our Technology Utilization Program.

New Technology Representative

Enclosures

UNITED NATIONS



NATIONS UNIES

POSTAL ADDRESS--ADRESSE POSTALE UNITED NATIONS, N.Y. 10017 CABLE ADDRESS--ADRESSE TELEGRAPHIQUE UNATIONS NEWYORK

REFERENCE: PRU 80 TARS 0.3

21 May 1980

Dear Mr. Brennen,

Post: Consultant for Rotodynamic Pumps

Duration: Three weeks (during period March - April 1980)

With reference to the communications exchanged earlier, we take pleasure in enclosing a Special Service Agreement in quadruplicate in respect of the assignment noted above.

We would appreciate your filling in the payment instructions in the space provided, signing and returning all the carbon copies at your earliest convenience; the original is for you to retain.

Yours sincerely

Gian Carlo Treggi

Technical Assistance Recruitment Service Department of Technical Co-operation for Development

Mr. Christopher Brennen 360 Olive Tree Lane Sierra Madre, Ca. 91024

tadied are the completed as A greenents. Please

Many copies (wester than 10)

UNITED NATIONS JEVELOPMENT PROGRAMME



TELEPHONES : 54241-245 &

54218

Coastal Engineering Research Centre and Development of Hydraulic Instrumentaion PROJECT

CABLES : CEWAPORES, POONA

TELEX : PN 014-390

45203, 45604 45806, 45652

P. O. Khadakwasla Research Station, Poona - 24, India.

Reference: IND/73/042/3

23 October 1978

Dear Dr. Brennen,

This has reference to my letter under even number dated 22 August 1978 concerning your forthcoming assignment with us. A fresh copy of my letter is attached for ready reference. Kindly let me know the period and duration convenient to you for your visit to the Research Station.

I may mention that the procedural formalities of the United Nations and the Government of India take quite some time. In addition, as also mentioned in my previous letter, I have to commit a group of officers to be associated with you and also complete some other actions before your arrival. I would, therefore, request an early reply from you so that I may proceed further in the matter.

With regards,

Yours sincerely,

P.C.Saxena Project Director

Dr. Christopher Brennen. Division of Engineering & Applied Science 104-44, California Institute of Technology, Pasadena, California 91125, U.S.A.

ONDP Coastal Engineering Research Centre and Development of Everaulic Instrumentation Project. P. C. Khadakwasla Research Station, Poona 24, (India).

IND/73/042/3

22 August

Dear Dr. Brennen,

Thank you very much for your letter of 10 August 1978 and your willingness to undertake a consultancy assignment at our Research Station. I appreciate your difficulties to accommodate a six-week assignment in your busy schedule. Please let me know whether a four-week assignment will be convenient to you.

I may mention that we are also inviting a few other consultants in 1979. Our practice with respect to the consultancy assignments is that we plan the programme of the consultants well in advance so that all formalities connected with UNDP and Government of India are completed in time. Besides we also commit a group of officers who have to be associated with the consultants during their assignments. This is done with a view that we are able to pay maximum attention to the consultants and at the same time ensure that the programmes of work outlined are implemented effectively. We would also like to ensure that your consultancy assignment does not clash with other important engagements. For this reason, may I request you to please let me have some idea about the period convenient to you so that we could plan the programme accordingly. Upon hearing from you, I will also advise the United Nations to contact you for finalising other arrangments.

With regards and looking forward to the pleasure of walks welcoming you to Pune.

Yours sincerely,

Sd/---

P.C. Saxena Preject Director

Dr. Christopher Brennen, Division of Engineering & Applied Science 104-44, California Institute of Technology, Pasadena, California 91125, U.S. A.

UNITED NATIONS



NATIONS UNIES

POSTAL ADDRESS-ADRESSE POSTALE: UNITED NATIONS, N.Y. 10017 CABLE ADDRESS-ADRESSE TELEGRAPHIQUE UNATIONS NEWYORK

REFERENCE: PRU 79

26 February 1979

Dear Mr. Brennen,

Your name has been suggested as a possible candidate for the post of Consultant for Rotodynamic Pumps, IND-150-3-042-03-X, in India. I am writing to ascertain your interest in and availability for this mission. A copy of the relevant terms of reference is enclosed.

If after studying the attached job description you consider yourself qualified and would be interested in pursuing your candidature, would you kindly complete and return to us the enclosed Personal History forms.

In the event that you are interested, we would appreciate some indication of the date of your availability.

We hope to have the pleasure of hearing from you soon.

Sincerely yours,

Gian Carlo Treggi Technical Assistance Recruitment Service

Mr. Christopher Brennen 3840 Mayfair Drive Pasadena, California 91107

JOB DESCRIPTION

Post Title

Consultant for Rotodynamic Pumps

Duration

to veeks

Period

1979 or 1980

Duty Station

Pune, India

Duties

The consultant shall carry out the following functions:

- i) Deliver lectures to the engineers of CWPRS in the subject of clear water rotodynamic pumps. The subject would include centrifugal pump theory, pump design and development, pump construction and performance, water hammer, vibration and noise in hydraulic machinery, cavitation in pumps, model and prototype testing of pumps etc.
- ii) Supply lecture notes atleast one month in advance of the arrival of the consultant for duplication and distribution amongst participants.
- 111) Conduct Workshops and organise group discussions.
- iv) Submit a report on the assignment at the end of the assignment.

Qualification

Research engineer with preven experience and specialisation in the field of rotodynamic pumps.

Language

English

UNITED NATIONS DEVELOPMENT PROGRAMME



संयुक्त राष्ट्र विकास कार्यक्रम

TELEPHONES: 445550-51- 52

: 445203,445604 : 445806,445652 UN/ UNDP PROJECTS AT CENTRAL WATER & POWER RESEARCH STATION

CABLE : CEWAPORES, POONA

TELEX : PN 0145-390

P. O. Khadakwasla Research Station, Poona-411024, India.

22 August 1978

Reference: IND/73/042/3

Dear Dr. Brennen,

Thank you very much for your letter of 10 August 1978 and your willingness to undertake a consultancy assignment at our Research Station. I appreciate your difficulties to accommodate a six-week assignment in your busy schedule. Please let me know whether a four-week assignment will be convenient to you.

I may mention that we are also inviting a few other consultants in 1979. Our practice with respect to the consultancy assignments is that we plan the programme of the consultants well in advance so that all formalities connected with UNDP and Government of India are completed in time. Besides we also commit a group of officers who have to be associated with the consultants during their assignments. This is done with a view that we are able to pay maximum attention to the consultants and at the same time ensure that the programmes of work outlined are implemented effectively. We would also like to ensure that your consultancy assignment does not clash with other important engagements. For this reason, may I request you to please let me have some idea about the period convenient to you so that we could plan the programme accordingly. Upon hearing from you, I will also advise the United Nations to contact you for finalising other arrangements.

With regards and looking forward to the pleasure of welcoming you to Pune,

Yours sincerely,

foreve

P.C.Saxena Project Director

Dr. Christopher Brennen,
Division of Engineering &
Applied Science 104-44,
California Institute of Technology,
Pasadena, California 91125,
U.S.A.

UNITED NATIONS DEVELOPMENT PROGRAMME



संयुक्त राष्ट्र विकास कार्यक्रम

TELEPHONES: 445550-51- 52

; 445203,445604 : 445806,445652 UN/ UNDP PROJECTS AT CENTRAL WATER & POWER RESEARCH STATION

CABLE : CEWAPORES, POONA

TELEX : PN 0145-390

P. O. Khadakwasla Research Station, Poona-411024, India.

23 June 1978

Reference: IND/71/601/3-CB

Dear Dr. Brennen,

My colleague Mr. C.P.Venkataraman has mentioned to me about his meeting you at Pasadena during his visit last April as a United Nations Fellow. He was very impressed by the research being done in your department at Caltech and by your earlier work at NPL which he had visited in 1967.

Mr. Venkataraman has already mentioned to you that we are setting up a hydromechanics laboratory for research on pumps, with UN assistance. A Cavitation research laboratory is already in existence wherein turbines can be tested.

Under our UN Project we have provision for inviting experts such as yourself from abroad to train our project engineers through lectures and discussions with particular reference to turbomachinery. One of the areas in which we are interested is that of design development of rotadynamic pumps and pump test techniques. I wonder whether you would find it possible to spare some time from your busy schedule to come over to India and guide us in this area. The consultancy positions have a duration of up to six weeks and we would be glad to have you for that duration. If you, however, find that your schedule cannot accommodate such a long absence from Caltech. we would be willing to consider a shorter duration which could be made more effective by careful planning through correspondence. I would be grateful if you would let me know whether you could accept such a consultancy assignment and if so the duration and dates of your convenience. On receiving a favourable reply from you I would contact the United Nations in order that they may approach you formally with regard to the terms and arrangements. For this purpose we would require six copies of your bio-data indicating name, date of birth.

nationality, educational and professional qualifications, list of publications etc.

I enclose a copy of our brochure and look forward to the pleasure of welcoming you to Poona.

With regards,

Yours sincerely,

P.C.Saxena Project Director

Dr. C. Brennen,
Department of Mechanical Engineering,
California Institute of Technology,
Pasadena, California,
U.S.A.

COURSE NO.	SUBJECT		DETAIL.	SHEET	
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USHA 39T L. C. WOODS

Professor of Mathematics (Theory of Plasma)

Telephone 0865 54295

Mathematical Institute 24-29 St Giles Oxford OX1 3LB

LCW/PF

Professor Christopher Brennan,
Division of Engineering and
Applied Science,
California Institute of Technology,
Pasadena,
California 91125,
U.S.A.

12th June 1980

Dear Chris,

Looking through my files, I see that you have not replied to my letters of 1st February 1979 or 31 October 1979. In these letters I mentioned a contract that had been sent to you from O.U.P. for your book on cavitation. Have you given this project up? and if so could you suggest someone else who might be prepared to write the sort of book you had in mind. Personally I think it is a pity for you not to write a book at this stage in your career.

I suppose the time is long since passed that you would wish to return to this country to an appointment in Oxford. The man we appointed in Balliol when you were an applicant (John Bridgwater) has just accepted an appointment as Professor of Chemical Engineering at Birmingham. Balliol is about to advertised a replacement and I am on the selection committee both for the Department of Engineering Science and the college. The professor we are seeking is somebody working in 'Mechanical Engineering', broadly interpreted. This means someone to teach Fluid Dynamics, Thermodynamics and similar topics. The salary for a person of your age would be something like £16,000 or £17,000 p.a. when college perks are added.

Please give my regards to Philip Saffman.

Yours sincerely,

hes

L.C. WOODS

+ F.G. The dooning date is and of June.

cc Mr. D. Degenhardt



### BROOKHAVEN NATIONAL LABORATORY

### ASSOCIATED UNIVERSITIES, INC.

Upton, New York 11973

Office of the Director

(516) 345- 3336

May 12, 1980

Dr. Christopher Brennen 360 Olive Tree La. Sierra Madre, CA 91024

Dear Dr. Brennen:

Enclosed for your records is a signed and approved copy of a supplement covering your services as a Consultant to Brookhaven National Laboratory.

Sincerely yours,

R. Christian Anderson

Assistant Director

RCA/am Enc.

#### CALIFORNIA INSTITUTE OF TECHNOLOGY

PASADENA, CALIFORNIA 91125

OFFICE OF THE PRESIDENT 340-32

TELEPHONE (213) 795-6811

March 31, 1980

Dr. Christopher Brennen 360 Olive Tree Lane Sierra Madre, California 91024

Dear Dr. Brennen:

The Executive Committee of the Board of Trustees, at its meeting on February 11, 1980, authorized an increase in your salary to \$36,000 per annum, effective October 1, 1980.

We fully recognize the importance of the contribution that the Faculty makes to the continuing success of Caltech as a research and educational institution. We greatly regret that inflation diminishes so much the helpfulness of the salary increases that we are able to make this year.

The Institute's contributions to your benefit programs will be adjusted in accord with your new salary and these will be reflected in the statement of benefits you will receive later in the year.

Sincerely,

M. L. Moldberger

Marvin L. Goldberger

cc: Provost



# BROOKHAVEN NATIONAL LABORATORY

### ASSOCIATED UNIVERSITIES, INC.

Upton, New York 11973

(516) 345- 3336

Office of the Director

August 1, 1980

Dr. Christopher Brennen 360 Olive Tree Lane, Sierra Madre, California 91024

Dear Dr. Brennen:

I am happy to inform you that your consulting fee has been increased to \$305 per day, plus reimbursement of travel and subsistence expenses. Therefore, it is necessary that a new contract be executed which will be effective from July 28, 1980 through July 27, 1981.

Please sign and return both copies. Upon completion, a fully signed and approved copy will be sent to you in the usual manner. This contract is to provide for intermittent services of a day or two at a time, and not, in general, for continuous periods of more than a week.

I trust the above arrangements are satisfactory and we look forward to having you continue to work with our staff.

Sincerely yours,

R. Christian Anderson Assistant Director

2. Unatran Anderson

RCA/am Enc.

### CONSULTANT AGREEMENT SUPPLEMENT

SUPPLEMENTAL AGREEMENT NO. 2 , dated as of April 17 1980, to Contract No. 2541 (hereinafter called "the Contract"), between ASSOCIATED UNIVERSITIES, INC., Upton, New York (hereinafter called "Brookhaven") and Christopher Brennen Social Security No. 553-92-4055 (hereinafter called "the Consultant").

### WITNESSETH:

WHEREAS Brookhaven has heretofore entered into the Contract with the Consultant for the rendering of Consultant services; and

WHEREAS the parties wish to extend the term of the Contract;

### NOW THEREFORE THE PARTIES AGREE AS FOLLOWS:

- 1. The expiration date of the Contract as set forth in paragraph 1 thereof, is hereby changed to 4/15/80 4/14/81
- 2. Except as herein specifically amended the Contract shall continue in effect without change.

Limited to 40 days for the period IN WITNESS WHEREOF the parties hereto have executed this supplemental agreement as of the date above written.

ASSOCIATED UNIVERSITIES, INC.

Form 1740 B



B-0908

(new)

This CONTRACT No. 2870, dated August 1, 1980 is between ASSOCIATED UNIVERSITIES, INC., Upton, New York (hereinafter called "Brookhaven") and

Christopher Brennen,
Sierra Madre, California

Social Security No. 553-92-4055 (hereinafter called the "Consultant").

WITNESSETH:

WHEREAS Brookhaven has contracted with the United States of America (hereinafter called the "Government") represented by Department of Energy (hereinafter called "DOE") under Contract No. EY-76-C-02-0016 to perform certain work; and

WHEREAS the Consultant is willing to render services as an advisor to Brookhaven with respect to a portion of said work;

### NOW THEREFORE THE PARTIES AGREE AS FOLLOWS:

1. This contract shall commence on July 28, 1980 and continue through July 27, 1981, during which time the Consultant shall perform such of the following services as Brookhaven may from time to time request:

### Department of Nuclear Energy

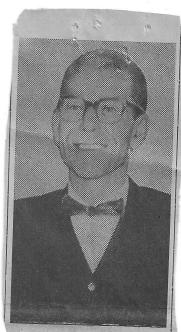
2. Brookhaven shall pay the Consultant for his or her services hereunder at the rate of \$ 305/day* for each full day consisting of eight (8) or more hours, upon the presentation to Brookhaven at the end of each calendar month of the Consultant's bill specifying the number of days (including fractions thereof) during such month on which he has rendered services hereunder.

Brookhaven shall also reimburse the Consultant for transportation, subsistence and lodging expenses incurred by the Consultant in the performance of his or her services hereunder to the extent and on the conditions set forth in Brookhaven's travel policy at the time in effect; provided, that the Consultant not be reimbursed for subsistence expenses for more than 20 days in any continuous period of time without DOE approval. For purposes of reimbursement, as herein provided, the Consultant's base shall be deemed to be Sierra Madre, California

Brookhaven shall also reimburse the Consultant for expenditures for the services of a typist at a rate not to exceed \$5.00 per hour, upon the basis of receipted bills therefor, but for no other expenditures for services except as expressly authorized by Brookhaven in advance in writing.

3. During the course of the work under this contract and upon its completion, the Consultant shall furnish reports as requested by Brookhaven summarizing his or her services hereunder, making, in accordance with the provisions of paragraph 4 hereof, a complete disclosure of any and all inventions made or conceived during the course of his or her services hereunder, and certifying in writing that such disclosure is complete. Brookhaven may withhold all or any part of the payment due the Consultant hereunder until the above requirements have been fulfilled and until patent clearance covering the Consultant's work under this contract has been granted by DOE.

*Limited to 40 days for the period



MR. W. M. BRENNEN

# Services to youth

Mr. Wilfred Macauley Brennen, F.R.C.S., Cranagh Dhu, Magherafelt, receives the O.B.E. for services to the welfare of youth in Northern Ireland.

Chief Commissioner for Scouts in the Province, he is senior consultant surgeon at the Mid-Ulster Hospital.

A native of Belfast, Mr. Brennen is a founder member and now President of the Northern Ireland Marriage Guidance Council. He is also President of the Mid-Ulster Branch of the Spina Bifida and Hydrocephalus Association.

He is a Commander of the Order of St. John of Jerusalem and Chairman of the County Londonderry NSPCC

When the Mid - Ulster Hospital - converted from the town's old Workhouse came into existence in 1945, Mr. Brennen was the first to be appointed to the medical and nursing staff. He supervised the formation of the medical and nursing teams to man the new hospital in those early days and it is in great measure due to his skill and ability that the hospital enjoys its present high reputation.