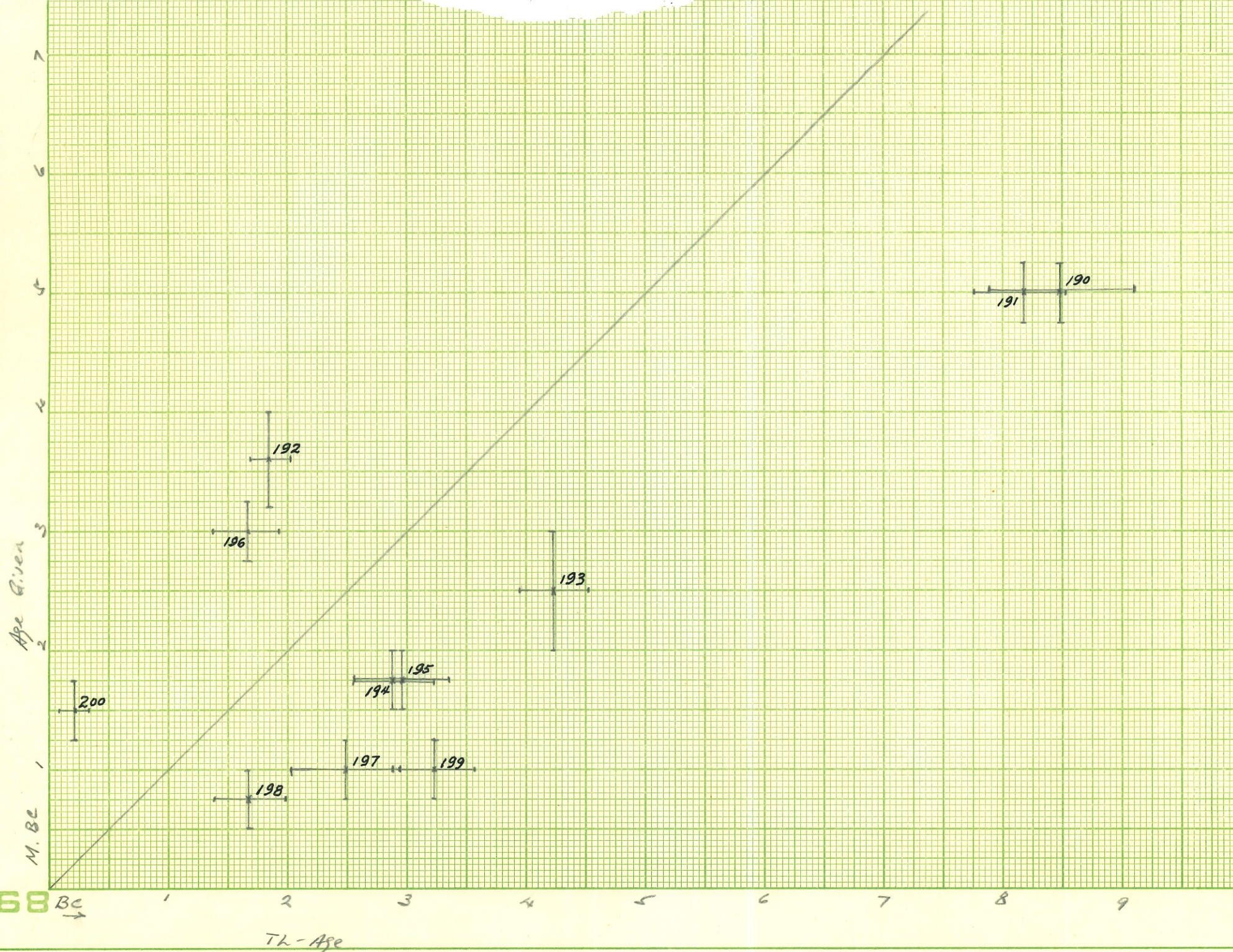


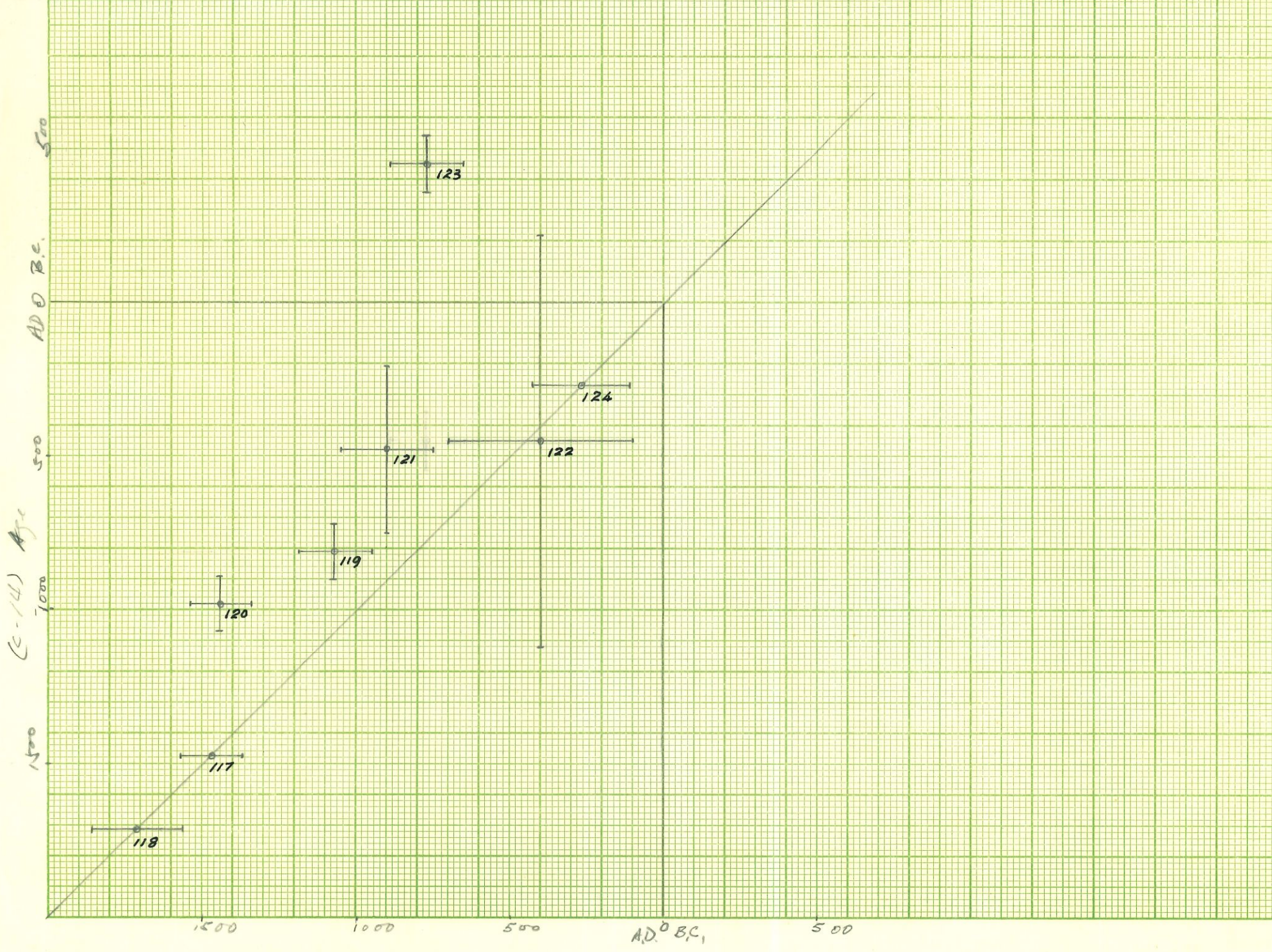
Following eight pottery samples were submitted by Dr. N.C. David
of U. Museum.

All samples were from Daima, N.E. Nigeria.

TL dates given are based on our Known-Age Calibration Curve.

Sample Number		C-14 Age	Spit #	TL Calc. Age
NHRS-	P-T-			
671	117	-----	1	1470 ± 100 AD
672	118	-----	2	1715 ± 150 AD
6710	119	810 ± 90 AD	13-14	1070 ± 120 AD
6711	120	980 ± 90 AD	15-16	1440 ± 100 AD
6719	121	480 ± 270 AD	31-32	900 ± 150 AD
6720	122	450 ± 670 AD	33-34	400 ± 300 AD
6727	123	450 ± 95 BC	47-48	770 ± 120 AD
6730	124	-----	53-54	270 ± 160 AD





Th-Age

Daima N.E. Nigeria

	1965	1965	1966	1967	1968	1969
Background counts		182	94	93	113	158
Calibration counts		85	40	52	83	93
Known-age counts		133	108	30	97	53
" " # of samples		33	30	11	26	13
" " Av. counts/sample		4	3.6	2.7	3.7	4.1
Unknown counts		457	221	180	247	250
" " # of samples		178	93	48	91	78
" " Av. counts/sample		2.6	2.4	3.8	2.7	3.2
Counting Days lost		43	217	355	160	157
Human Error		3	3	2	3	3
Power failure		2	4	2	11	4
Impure samples				3	4	6
count strays						2
High Background						
High voltage power supply		6		2	7	1
G-M's		15	149	255	66	98
counter leak				4	3	
Rebuild countek						5
G-M scalers		7	7	23	1	28
Anti-coincidence						
ch. 3 circuit						
Disc power supply		3		4	2	5
Delay box					2	
Veto						
Radon check					4	
Amplifier		1		31	3	2
Pre-amp		1			2	2
Shut down due to electrical installation						
ground lead						
Mixer supply				1		
Scalers		3	5			
High voltage conn.						1
Problems due to lack of air-cond.		2			3	
Contamination check after ceiling leak						
Vacuum line contamination		22		4	22	
Filling line leak					24	
Quartz counter experiments			24	24		
Install air-cond.			48			
clock			1			
scaler micro-switch						
leak BWG ceiling						
INSTALL + TEST C V						
Rebuild & reinstall CII after removing C V						
Ca O Problems						
Flood						
Install + calibrate equipment CII						
Printer tape jammed						
Wash + anneal CII						

The proposed project is an excellent one. Scientists at the University of Rochester in collaboration with others have just recently demonstrated that it is possible to measure natural ^{14}C directly by means of a tandem accelerator, mass spectrographs, etc. This is a tremendous breakthrough toward a better technique for carbon-14 dating.

Much more experimentation is required before this method can be made quantitative & reliable. The experiments that Dr. Beukens has planned are ones that need to be done to answer some of the questions & solve the preliminary problems.

His ^{previous & continued} collaboration with the University of Rochester & General Ionex, Inc. are, of course, essential to ~~the project~~ the program.

Since we are also experimenting with this new method in ~~our~~ Department of Physics, we realize too that the use of an existing tandem accelerator is not ideal because of contamination from other ^{previous} uses of the equipment. Therefore, his plan to collaborate with Oxford (over)

where they plan to design a new 2 MV
accelerator is good. I question only
that it will be operational as soon as
late 1978.

The ~~req~~ budget is certainly not
excessive, and in summary, I
recommend highly that this
request be granted.

Space

Sincerely yours,

Elizabeth K. Ralph

P.S. An appropriate assessor is
Prof. Roy Middleton
Tandem / 2N8 DRL/EI
Dept. of Physics
U. of Pa. Phila. Pa. 19104

TL DATES FOR SAMPLES OF UNKNOWN AGE

Sample No.	Submitted by	Description	TL Age
126	F. Dickson	Under water find off the coast of Haiti	1458 \pm 100 A.D.
185 } 186 }	R. F. Marx	St. Anne's Bay, on the N. coast of Jamaica	1678 \pm 150 A.D. 1637 \pm 100 A.D.
116	R. Dyson	67-19-1 cup. Hacilar, Turkey. Per. I, Early Chalcolithic. ca.5250-5000B.C.	5070 \pm 520 B.C.
101	VanderPool	"Roman" tile found in excavation within Paul III cupola in the Church of St. Maria in Aracoeli on the capitoline Hill	1675 \pm 100 A.D.
210 } 211 }	Rainey	Mexican Figurines	2664 \pm 283 B.C. 2744 \pm 300 B.C.
214	Rainey	Libya, near place called the cathedral of Sahara (should be Neolithic)	6997 \pm 420 B.C.

The following eleven pottery samples were submitted by W. Sumner of U. Museum, via R.H. Dyson.

All samples were from the area of Kur River Basin, Fars, Iran.

TL dates given are based on our Known-Age Calibration Curve.

Sample Number #	P-T-	Approx. age information given by Sumner	TL Calc. Age in B.C.
1	190	Late neolithic, late 6th or early 5th M. BC	8468 ± 632
2	191	Contemporary with #1	8192 ± 382
3	192	4000-3200 BC	1846 ± 176
4	193	3rd Millennium BC	4237 ± 286
5	194	Mid. 2nd M. BC or earlier	2881 ± 350
6	195	Contemporary with #5	2950 ± 390
7	196	Late 3rd or early 2nd M. BC	1662 ± 275
8	197	End of 2nd or early 1st M. BC	2490 ± 450
9	198	Early 1st M. BC	1685 ± 300
10	199	Late 2nd or early 1st M. BC	3225 ± 368
11	200	Mid. 2nd M. BC	2205 ± 113

The last 20 or so years have seen a quite remarkable development in the practical techniques used by the organic chemist, in particular for the investigation of mixtures and messes of previously intractable complexity. Curiously, little advantage has been taken of this so far in archaeology: such few examples of the use of modern organic chemical techniques as exist seem to be either sporadic or applied in a rather limited way. In the cognate field of sedimentary geology, on the other hand, modern methods are being applied to such questions as the origin of organic compounds in rocks and the fate of the organic component of fossils. One is therefore driven to ask if it would be advantageous to develop a capability for investigating such archaeological remains as fall in the realm of organic chemistry, taking full advantage of the sophisticated techniques now available.

General Possibilities

(1) Straight identification of "found" materials, such as gums, resins, varnishes, adhesives, pot residues. Further objectives would be: suggestion of possible sources, obtaining knowledge of old technological methods.

(2) Obtaining new kinds of evidence. E.g. the extraction of pottery finds to get information on what they were used to contain.

(3) Pushing back present limits on "the survival of the evidence" in the case of highly decomposed organic remains. This might range from trying to find "what was there" in the case of soil spots and stains to such things as systematic soil analyses in connection with studies of agriculture. It is worth noting that archaeologists are currently taking much interest in questions of ancient environment and studies of a generally "biological" nature. Since surviving material evidence must be organic in origin, it is likely that the organic chemist will find a part to play here. It is also true that work of this nature is at once long-term and more difficult to define in tangible form at the moment (though a careful and detailed study of possibilities might change this).. It is therefore suggested that, to develop laboratory capability, problems be sought at first under heads (1) and (2).

Particular possibilities that are immediately available.

(1) Identification work on vegetable resins found in Egypt, where survival conditions are particularly good. Particular interest in finding materials that had been imported.

(2) Investigation of funerary pottery in Near Eastern Section to try to identify what it was used to contain. Examples available over a range of periods.

(3) Various "isolated" identification problems are available from several sections.

Timetable

(a) The present radiocarbon lab. project involving JW extends to mid-1971; the period up to this point can be regarded as transitional. Some preliminary experimentation can be done in this time, given the purchase of at least a bare minimum of apparatus.

(b) From mid-1971, a properly funded project would be necessary.

Apparatus

The more sophisticated, and expensive, apparatus needed to apply the above techniques should be available on a time-paid basis by arrangement with members of the Chemistry Department. The Museum would need to acquire "bench" apparatus (glassware etc.), this being largely missing at present. Much of this can wait for a properly funded project, but any preliminary work would still require some purchasing during the present year.