

## APPENDIX F

### NOTES ON SPECIMENS OF ANCIENT STUCCO FROM KHOTAN SITES

BY

A. H. CHURCH, F.R.S.

PROFESSOR OF CHEMISTRY, ROYAL ACADEMY OF ARTS

ELEVEN specimens of ancient stucco, from ruined sites in the Khotan territory, Chinese Turkestan, have been examined by me chemically. They fall into two groups, one, soft and friable, being essentially silicious, and the other, hard and crystalline, being what is now known as plaster of Paris.

The following specimens belong to Group I:—

1. Stucco from statues in Rawak Stūpa Court.
2. Stucco from image, Rawak Stūpa Court, showing red surface and grey backing.
5. Stucco from detached clay-seal mixed with vegetable fibre from ancient dwelling N. xv, Niya Site.
6. Stucco from red clay-seal (N. xv. 133 a) from ancient dwelling N. xv, Niya Site.
7. Stucco from relief decoration of Buddhist temple, Endere ruins.
8. Backing earth mixed with vegetable fibre from stucco relief (E. i. 015), Endere ruins.
10. Scraping from painted slab of wall in Buddhist shrine (D. 11), Dandān-Uiliq Site.

The material of which these specimens consist resembles adobe or loess, but, as will be seen from the quantitative analyses of Nos. 1 and 7 given further on, it contains a rather notable amount of combined water. This feature points to the presence of a considerable proportion of true clay (hydrous aluminium silicate) in these stuccoes. The variation in the colour of the specimens is not important; it depends upon the state of the iron present. In the yellow material the iron exists as ferric hydroxide, in the red as ferric oxide, and in the grey as a lower oxide or as disulphide.

The two analyses here given of the specimens Nos. 1 and 7 belonging to Group I are not exhaustive, as several of the minor constituents, such as phosphoric acid and alkalis, were not separately determined, while the residue, included under 'silica and silicates insoluble in hydrochloric acid' comprises felspathic and micaceous minerals. It should be added that small amounts of the lime and magnesia found were actually in combination with silica, but it has been thought expedient to exhibit the lime as carbonate and the magnesia as free. Here are the percentage results of the two analyses:—

	No. 1	No. 7
Water given off at 100° C. . . . .	3.06 . . . . .	2.00
Water given off on ignition . . . . .	8.58 . . . . .	6.20
Silica, and silicates insoluble in hydrochloric acid . . . . .	57.40 . . . . .	67.30
Ferric oxide ( $\text{Fe}_2\text{O}_3$ ) . . . . .	5.59 . . . . .	5.20
Alumina ( $\text{Al}_2\text{O}_3$ ) . . . . .	6.81 . . . . .	7.50
Lime, as Calcium carbonate ( $\text{CaCO}_3$ ) . . . . .	14.72 . . . . .	8.66
Magnesia ( $\text{MgO}$ ) . . . . .	3.22 . . . . .	3.12
Sulphuric anhydride . . . . .	none . . . . .	trace