Medical Group - M.B.B.S. MB Pharmacy

Medical group consists of 148 students, 95 boys, and 53 girls. The age ranges between 19 years 2 months and 30 years 9 months.

The method of collecting data for this group was the same as with other groups. A first contact with the principal of the college was followed up by a personal visit. It took a better part of six weeks to collect this data. There had to be a short stoppage in the series of testings because some of the relevant groups had to appear for their six-monthly examinations.

The degree of cooperation from the students varied from group to group. Number per testing session varied from a full house of 20 to 6 on a day. There were in all 11 test sessions which should have theoretically covered 220 students but only an average of 14 per session were done. In the whole it could be said that they were 'very cooperative', punctual about appointment, critical of their performance on a test of this nature, and seemed to have a stereotyped idea about the work of a doctor which they were training themselves to be. They thought that a doctor has nothing to do with numerical work and made comparison, also it was not possible for them to understand that a psychological test at the stage they
This sample consists of 3 level groups of medical students. After the Inter Science Biology background there is a pre-medical test which is used for selecting the medical students. One and half years are spent in training of the general medical curriculum. Then the students start on their first clinical term. This is practically the level equivalent to junior of postgraduate classes. These clinical terms, then, are of one to one and half year duration until they finish the third clinical term. Because the degree is a double bachelor's degree in medicine and also in surgery (M.B.,B.S. = Bachelor of Medicine & Bachelor of Surgery) it takes longer to finish, and the nature of work is loaded with learnings of specialised complex details and techniques of surgical operations and factual informations. Emphasis is more on professionalised practical, in the clinic and ward actual case work, than on merely book learning from text books.

There are 79 students in the 1st clinical, 42 in the 2nd clinical and 27 in the 3rd clinical group. This classification has its importance from the point of view that at each level there seems to be a process of progressive selection at work. This fact will be further clarified by presenting data on the differences of scores of passes and failures at each level.
Method: Data and Formulation

The sample presents a difficult problem as far as analysis of data is concerned. There can be several methodological problems raised and only partially answered. Important problem is to be able to distinguish between the 'successful' and 'unsuccessful' in this training. Secondly, the test variables which are able to differentiate between this group and others. Third, is the problem of finding the profile for this group.

The method of analysing the data, for this group, has suffered from the defect created by somewhat dissimilar studies various groups have to do at various levels. Since the test is sensitive to immediate learning habits and continuously practiced material, it becomes difficult to point out, except by using elaborate statistics for each group, that most students perform homogeneously on any aptitude test. It is possible that suppressor effects are presented at various clinical group levels because of the change in the current curriculum followed in such successive clinical class. It is possible that the first clinical group studies Physiology, second group studies Anatomy and the third one, Surgery. The final score on each test will then be suppressed by each group score with the result that their correlations with various examination marks will be lowered and rendered insignificant. On the other hand there seems to be no reason within the framework of the present study,
to do the detail subgroup analysis. The method adopted as a compromise between the two is to see the differences in scores of 'pass' and 'fails' and accordingly use the Fisher's tables to see if even a low correlation may be used, to find the proportion of the successful.

To find the test variables usable for diagnosis, it will be shown that comparison of the statistics of this group and the criteria group is possible on the basis of which a significant profile can be drawn. The profile for the medical group can be made by seeing the most significant tests and examinations scores and taking the cutoff score at reasonable levels. It will be possible to isolate some tests and examinations, the scores on which characteristically differentiate this group with others.

Age and sex differences in the group will be computed for all measures and the trends noted. It is possible that these age groups will be of use in indirectly showing the differences between the clinical groups. Tables showing these will be presented from the inspection of which easy comparisons are possible.

Sample of Medical College at Ahmedabad represents about 40% of the total students who appeared for the Ist, IIInd and IIIrd I.M.M.S. examination of 1961. The study covers 146 out of 337 students which is approximately 43% of the total. Sex representation data is not available. It is presumed that the proportion of girls and boys will not be higher at
other medical colleges in the state than at Almadabad which is a capital town and naturally female literacy and professional representation is likely to be at the optimum here. The sample here was, all the volunteers who were requested to help in the study. There was no selection or stratification planned or done. It should be borne in mind that examinations for medical are held every six months and naturally the students are examined and clinic minded and oriented.

Data cover all the variables which are under investigation. The test scores, various examination marks, age, sex. The method of test administration remained unchanged. The respondents had to fill out their personal data sheet after the end of the test. They were allowed to ask questions after finishing the test. Test testing was done in the lecture theatre of medical college.

Data is presented in its final form in Table No.5 and 6 (See appendix). Table 5 represents the Mean, S.D., S.H., and correlation coefficients of the pooled medical group of 79 students in 1st clinical, 42 in 2nd and 27 in 3rd clinical. The process of pooling has affected the statistical results of the sample. The size of all the statistics have been lowered and naturally the product moment correlations worked out have been suppressed. Table 6 which provides data showing the Means and S.D.'s for 'successful at the examination', sex, age and the three clinical groups
has to be provided to show the differences which exist in the subgroups. Correlations of the subgroup scores have not been worked out because it is visualized that descriptive statistics derived from the groups will show that predictive value increases which is based upon these statistics. Medical group has a preselected sample. Selection is based upon the percentage of marks gained at High School and Inter examination marks as well as a pre-medical test which is given high importance as far as admission to the course is concerned. As a whole it is expected that irrespective of the predictive value, this sample scores are generally significantly higher than several student group on most tests and examinations.

Results: Inspection of Table 5 brings out several outstanding facts about the sample. 1. Test 1 M of the sample is 44.3 with a S.E.M. 7.72 and 5.5.9.1. The successful or 'pass' group (66.64) has a M of 46.0 and 5.0.6.25. Boys score higher on the M than girls. The M respectively for the groups being 44.9 and 43.1 with S.E.M 7.25 and 10.1. Amongst the clinical groups I,II,III means of 43.3, 45.45, 45.36 with S.E.M of 9.45, 8.25, 7.95 are achieved. The data above suggests that the mean of this sample compared with the Total student group is higher and the S.D. is lower, suggesting that there is comparably a little more homogeneity in the group on this test. The 'pass' group is decidedly higher on the M and it seems significantly higher than the total group as well as pooled medical group. Sex
differences are not too clearly differentiable because there is a large overlap. Probably there are no significant differences, but the indications are that boys tend to score higher on the mean and are less varied than girls.

The correlations of the test with other measures show a peculiar trend. Negligible correlations are achieved between test 1, spatial three dimensional perception test and last final examination marks. It would be expected that there is no correlation between test 3 & 1 sat in case of test 1 and L.F. it is rather different. Probably it will be seen that L.F. examination in the 3 different clinical groups cover many different factors and achievement and one cancels out others. Average r is .26. All correlations above .21 are significant at .01 and above .16 at .05. Except for test 3 and L.F. all correlations are significant at .01 level. Correlations with H.S., Int., test 3, L.F. are below the average. There seems to be a suggestion that clerical aptitude in this sample is a factor which goes along with several other factors. The distribution is negatively skewed. It seems that examinations and some other subtests have clerical aptitude as a common factor. It may be suggested that the development of this aptitude is a significant aspect as far as the training of the medical students as evaluated through the examinations is under consideration. Higher correlations are achieved between test 1 tests 5,6,4,7,2 and final examination.
2. Test 2 is the computation test. Sample has a mean of 24.0, just a little below the criteria group M score of 24.45, S.D. is 3.8. Pass group M is 24.265. Sex differences are not noticeable. Differences between the three clinical groups are not too clear but the 1st clinical group M score is 24.3, highest of the three. The differences do not seem to be significant for the various sizes of the clinical groups.

Average of r's between test 2 and other variables is .2147 which is significant at .01 level. Correlations between test 2 & 4, S.R., Final examination marks are not significant at any level of significance stipulated. Higher correlation with test 6 is expected. High school, test 5, Int. correlations with the test are significantly higher, showing the commonality of the aptitude manifested in obtaining the marks in these.

There is a suggestion here that the common element is that capacity of students which is developed generally to be numerically and mechanically accurate. Probably this sample in the formative years in S.3. and Int. have to develop both types of habits of accuracy. It may be characteristic of the group as different from the students who have numerical but not too dimensional perceptual accuracy found in more linguistic groups. Distribution is negatively skewed and leptokurtic.

3. Mean score of the sample on test 3 is 13.39, S.S.D. 4.39 & S.S.D. 5.34. Mean of the 'successful' group is 13.42. Boys score a M of 13.9 and girls 12.67 also the S.D.
for boys is slightly lower than girls. Within the clinical groups the 11th group has the highest $t$ score of 14.2 which seems significantly different from 13.21 for 1st and 13.12 for the 11th clinical groups. It is possible that it may be interpreted to mean that some course study helps this test score go high while diseases at other levels keeps the score lowered. The distribution shows as near normal as possible in this sample of three levels of medical students. Mean score compares favourably with the criteria group.

The average of correlations between this test and others is .1727. This is significant at .05. Higher than average correlations are recorded between this and tests 2, 4, 5, 6, 7, Int. Negligible correlations are found for this and tests 1, L.F., and Final Examination marks. Tests 3, 4, 6 have loadings of $g$ but the special abilities loadings are different for each of these tests. It cannot be said that the $g$ measured by this test is in any manner the general ability which is developed as part of Int. course. It was seen that in most professional groups it is manifested at these levels. There is a suggestion that on the whole it is a highly selected group as evidenced by generally higher $t$ scores on most variables, but at this level the test may not be so discriminative as is also true of the percentage of examinations marks. It may be later discussed that there is an element of difference in the motivational levels which make for differences in the acquisition of marks at higher levels of achievement.
4. M of test 4 is 14.15 which is significantly lower than the mean of the criteria group as well as the mean of American sample. It is slightly higher than the mean of the total student group. Since this group is a mixture of varied levels of medical students, further analysis shows that though it is a group mean score, it is only one of the indicators. The M is 5.43 and S.D. is .446. Mean of the 'successful' group is 15.32. Boys have a mean score of 14.63 and girls 12.2. S.D. for the former is 6.27 and latter 3.87. Differences on the mean of the three clinical groups are very marked. Int clinical group has a mean of 12.35, IIInd has a mean of 17.5 and the IIIrd a mean of 14.5. There is no doubt about the indicative value of these statistics. The vocabulary in English has its importance in learning medical information and the enlargement of this vocabulary reaches its peak by the end of the IIIrd clinical term.

The average of correlations between test 4 and other variables is .2205. This is significant at .01. Significant correlations are obtained between this test and tests 1, 3, 6, 7, H.2., L.F., and Final. All these are significant at .01. Utterly neutral correlations exist between this test and tests 2, 5 and Int. These are expected except in the case of Int. Other examinations show reasonably high correlations. The fact that correlations between tests 3, 4 and 6 are appreciably high shows that the common elements of 'general ability' which is present, shows itself plainly in the
case of this sample. Test 4 is significant for measurement of aptitude and ability of this sample. It may be made as an important factor of the profile of the medical group.

5. Mean of 27.96 with S.D. 4.89 compared with a mean of 24.75 achieved by the criteria group makes this test important for differentiating this sample with others. Uniformly higher K scores are achieved for 'successful' i.e., 26.0 for boys and girls it is 27.7 and 26.3 respectively. Clinical group H is 29.15, IInd clinical group M is 26.5 and IIIrd clinical group is 27.0. It is rather important that the test has mechanical matching as part of its essential performance. It may show that students at early educational training who do laboratory work at High School and later levels develop this aptitude more than non-laboratory going students do. For the group the test is significant.

Average of correlations between this test and others is .2102 which is significant at .01 for this sample. Higher than average correlations are obtained for tests 4, 6, Last Final and Final examinations. The contention that two dimensional perception is a distinct feature of this group is further reinforced by the correlations achieved between this test and H.S. and I.C. exam. marks. The fact that it makes little contribution towards examinations at medical college may be due to the supplementary fact that finer perceptual discrimination as tested by test 7 which also contributes to the measurement of two dimensional perception aptitude
is more influenced by practice than the mechanical
catching aspect of it.

6. Arithmetical reasoning, computation is considered
by medical students as unessential for their purpose.
The mean is 11.7, 3.2. is .2 and 3.5. 2.4. 'successful'
have a mean of 12.0. Girls have a mean of 10.92.
Clinical groups scores on the mean are 10.92, 12.6, 12.12
respectively for I, II, III. It is peculiar that these
mean scores keep rising even though no particular
training is imparted. It seems part of the general
ability as it develops in the medical training. S.D.s
for these groups show that the variability in various
groups keeps declining. The distribution is decidedly
leptokurtic.

Average of correlations between this test
and others, is .24. Higher than average correlations
are obtained with tests 1, 2, 3, 4, 6.5. and final exam.
marks. Neutral correlations are obtained with I.?.
Int. insignificant ones with tests 5 & 7. It should be
noted that final exam. marks and test 6 correlate
significantly. It is one of the predictive tests at
that level but other medical examination exam. marks
have little correlations. In this group it should be
noted that at no other examination except 6.5.
Arithmetical reasoning and computation exams. are held.
It may be pointed out that though H scores are not too
different than other groups but they show gradual
changes towards better. They become meaningful as the final exam stage. The test has a loading of 6 and inter-correlations of .27 & .42 with tests 3 & 4 are probably to be accounted for by this factor underlying these tests.

7. Test 7 is two dimensional perceptual discrimination test which is expected to be a strong point of this sample because the medical groups more often than not have to practically deal with finer visual comparisons in the form of measurement in surgery of cuts as they are to be treated. The Mean score is 23.99 with a S.D. of .42 and 5.3. 5.27. The Mean of the 'successful' group increases to 24.5. Mean for boys is again 23.99 & 5.2 & 3.54 while girls have a Mean of 24.2 & 4.6 & 2.94. Means of I, II & III clinical groups are 24.2, 23.5, 24.75 respectively. On the whole this group characteristically shows a different trend then other student groups. The distribution looks normal with a slight positive skew.

Average of correlations between this test and others is 2115. It is significant at .01. Above average correlations are recorded between this test and tests 1, 2, 4, 5. Correlations just below the accepted levels of significance are recorded between the test and 3, .5,. Int. and Final exam. Amongst the examinations, it should be observed that last final exam and this test correlation is significantly high. It is one of the tests which is a little
meaningful in predicting performance in the last final examination.

6. Mean of the percentage of marks at High School for the sample is 63.4 with S.E.M. 0.7 & S.D. 6.55. There are 2 students in 3rd class, 43 in 2nd, 102 in 1st class with 15 of those in 1st class with distinction. There is a decided positive skew in the distribution. 'Successful' group has a Mean of 67.3 boys - 62.6 and girls 65.55. Surprisingly there are slight differences among the clinical groups, vis. I clinical Mean is 63.0, II clinical Mean is 65.35 and III clinical group Mean is again 63.35. These measures show several important points to be discussed later.

The examination has an average correlation of .2787, the highest average of tests so far. There are no neutral correlations. Insufficient correlations are achieved between the exam. marks and tests 3, 7 only. Correlations achieved between this test and tests 1, 2, 4, 5, 6, Int., L.E., and final are significant at .01. The meanings of these are obvious. It shall be seen that High School exam. is probably better indicator of general educability than other examinations including the Inter. Exam. It is known that certain specialisation starts taking place soon after this exam.

9. Inter. exam. is the turning point for this sample, towards the medical degree and the profession. The pre-medical test is open to the Int. pass students. The fact that the Mean of sample at this level is 61.27
shows that probably very few less than the very good students have the chance of getting through this test. The 5.5 is 6.57 with a S.D. equal to .54. Mean of the 'successful' is 62.39. Mean score of the boys is 60.6 & for girls it is 62.1. Clinical group I mean is 63.15, of the II is 60.45 and that of III is 57.5. The distribution is positively skewed. There are no IIIrd class Int. Sc. students.

Average of the correlations between Int. and the scores of other variables is .3421. Significant at .01 correlations exist between Int. and tests 1.2.5. 3.5, 1.5 & Final. Correlation with test 3 is significant at .05. Insignificant correlations are achieved for this test and tests 4, 6 & 7. It is rather surprising that Int. biological training seems to take a toll of both, English vocabulary and arithmetical reasoning to a degree that they become meaningless at this examination. This fact will be discussed further. Clerical, Mechanical perception Computational ability, High School marks, Int. marks, Last Final exam. marks and Final exam. marks go together.

10. Last Final exam. is a mixed category exam. for this group. The L.F. exam. marks here are not indicative of the same group or content exam. It should be noted that L.F. exam. for the three clinical groups means exam. in three special subject in different aspects of medical training. For the 1st clinical group it may mean a thorough study and examination in Physiology & Pathology,
for the IIInd it may mean Anatomy, Histology and Pathological tests, for the IIIrd it may mean Surgery, Medicine, Diagnosis and various types of therapy.

The mean of IExam. marks is 56.16 with $s_e = 3.13$ & $s_e = 3.51$. The mean for the 'successful' is 57.46, for boys it is 56.15 and girls 56.3. The means of the three clinical groups I, II & III respectively are 56.3, 56.5 & 55.3. It should be noted that though these groups are different set of students appearing in different papers, yet the mean scores & $S_E$'s are not too different. The $S_E$'s are very small for these samples. The distribution shows a positive skew as well as leptokurtic tendencies. The condition for passing through is that a student should score 50% in each paper and 50% in the total. There is a very large number of failures at this examination because of this clause.

Average of correlations is .1496. Neutral values are achieved between this and tests 1, 2, 3, 5, 6. Correlations significant at .05 are achieved for tests 4, 7, H.S., Int. & Final examinations; those with H.S. Int. & Final are significant at .01. Probably a suppressor effect brings down the correlations. Only the vocabulary and perceptual discrimination tests have significant correlations. Generally, there is a fall in the mean scores at this exam. as compared with other examination marks at High School and Inter levels.
11. The final exam. again is an evaluation of content of mixed categories. The marks are not representative of any single level subject or content which is not the same for the three groups. On the other hand there are some peculiarities of this evaluation which makes meaning as related to the tests under study. The mean of the group is 52.62, 5.5 in 5 and 3.0.5.82. Mean of the 'successful' is 57.7. Mean for boys is 52.7 and for girls 54.0. The mean for the clinical group I is 52.65, for the II it is 55.0 and for the IIIrd it is 49.5. Discussion will show some more aspects of this exam. marks. Inspection of the distribution of marks shows that there is a normal distribution. Pass marks are 50% in total and 50% in each paper. This makes pass list shorter even though aggregate marks may be higher. At least 33% failures lie below 49% and they are to be considered certain failures in all respects. There are no more than 9 in a total of 142 who get higher aggregate than 61%.

The average of correlations between final exam. and other test is .2641. Significant correlations are achieved between this examination and tests 1, 4, 6, R.S., Int., L.S. There is neutral correlation between this examination and test 3. All significant correlations are significant at .01. Positive and near significant correlations are achieved between this examination and tests 2 and 7.

12. The category of 'successful' has been created to see the clear cases of those who passed in various
examinations. It is seen that the mean scores of this group of students is higher than the total group mean scores of this group of students is higher than the total group mean scores on all tests and examinations. Significantly different scores are achieved for test 1, 4, 6, H.S., Int., L.F., Final. It shall be discussed that these are also the variables which are found meaningfully related to each other for this group tests and examination performance.

13. Sex differences exist. Boys score higher than girls on tests 1, 3, 4, 6. Girls' mean scores are higher than those of boys on tests 2, 5, 7, H.S., Int., L.F., Final examinations. It is interesting that the sexes act as suppressors or normalisers of scores on various aptitude and academic examination scores.

14. The categories of clinical groups are of necessity to be compared with each other. The clinical group examinations standards are theoretically the same but the content, training, practice, study are different. Average ages are also different. Clinical group I is the youngest and finished with the one and half year of theoretical information and general introduction to the medical training. They show higher Mean scores on tests 2, 5, 7, Int. Lowest Mean scores are achieved on tests 1, 3, 4, 6, H.S., and middle Mean scores on last Final and Final examinations. Clinical group II seems to have the sharpest of girls and boys from the medical group. Highest Mean scores on tests 1, 3, 4, 6, H.S., L.F., Final,
middle mean scores on test 2, and lowest mean scores on tests 5 & 7. Clinical group III seems to show the effects of progressive selection. They have lowest mean scores on tests 2, 3, Int., L.F. & Final exam., middle mean score on tests 4, 5, 6, 7, & 8. Since the age groups have not been formed in this medical group, these three clinical groups can be taken to indicate the differences on age variable also.

Discussion: - 1. The clerical aptitude scores of the sample correlate to a higher degree with other test scores. With the exception of three dimensional space perception and L.F., generally the aptitude has meaning and correspondence with other types of performances. Predictive relationship exists between clerical aptitude and High School, Int., and Final exam. marks. It seems that clerical aptitude in this form is not confined to the ability for matching names. In this sample probably it is the habit of quick matching of similar and different elements as a whole which is a common characteristic. It will probably be more correct to say that 'matching' the elements whether the task is verbal or mechanical or two dimensional discrimination, is a common element developed by this sample. The fact that verbal matching is slightly more meaningful than two dimensional, is brought out by the fact that clerical aptitude has higher correlation with examination marks than tests 5 & 7 have, at various levels of exam.
It will be seen that the mean of the 'successful' medical students differs significantly from the mean of the whole medical group. In this respect this sample seems entirely different from the entire student body. The test should form part of the aptitude profile for this group considering high rs.

2. Computational work does not seem to be strong point of this sample, though the mean score is higher than many student groups Mean scores. Highest correspondence shown is with the scores on arithmetical reasoning test, High School exam. marks and Int. exam. marks. This correspondence lessens itself with all medical exam. to insignificance. It is known that medical training has little numerical work and the aptitude for dealing with numbers is left unpractised with the result that it lies dormant in this type of sample for all practical purposes. The fact that respectable correlations exist between this test and two and three dimensional space perception tests need some discussion. It can be said that these factors are secondary factors as far as their relation to medical examinations are concerned. On the other hand the level of aptitude is of generally high order even though they may not be found to be meaningfully related to academic achievement scores. The element of the magnitude of the aptitude is the main asset the sample possesses. Computational ability is not a primary ability in examination but it exists in quantity enough to enable in competing with groups who
may have it as an essential special ability as expected of commerce and other physical science groups. It is an indication of the versatility of this group to possess an aptitude to a degree comparable with the group which is likely to use it in any directly meaningful work and examination operations.

3. Three dimensional space perception is the weakest point in the armour. It seems to be a pattern of education that space visualisation is never developed in any meaningful fashion, directed towards any work or training or achievement. Medical students have to visualise the structures of body but probably in two dimensional form only. The G factor probably makes the correlations with tests 4 & 6 respectable. Element of perceptual ability makes correlations with tests 5 & 7 meaningful.

4. Verbal ability is an essential aspect in medical school exam. and also other exam. It seems that English vocabulary is an important element in medical training. It may be estimated that the top students in High School and Int. distribute themselves in medical and engineering courses on the basis of the facility in English and mathematics and biology. The Dean of Clinical group II shows equal in level with the criteria group. It can be suggested that those with higher verbal ability in English do better enough to keep going through the examinations at medical college. The beginners take a little longer to start learning core vocabulary and
Two dimensional perceptual ability is measured on test 5 by matching figures of machines and tools. The meaningfulness of the development of this ability in this group becomes clear when we find that this group soon after the early general education career branches out even at H.S. and Int. level. They work in the laboratory and are supposed to see such elemental differences in their learning environment. This is part of their training to develop this ability. The fact that high correlations exist between clerical perception, visual differentiation and numerical computation in this sample, probably shows that these abilities may not be primarily useful in medical work but for practical purposes, these students are not bookish only. They trained for verbal as well as physical elements matching at least in their formative stages. It seems that it has become part of daily common sense which helps them in solving daily concrete problems by seeing the elemental structure of their environment. The fact that it is probably part of the early stage education at H.S. and Int. level to develop this ability is borne out by seeing the mean scores of the three clinical groups. It is seen that 1st clinical group has the highest mean which shows that the group has not been able to modify this ability which has been initially developed in this subgroup. The other older groups show lower mean scores probably showing
that though the level of ability does not change too much the ability becomes a little disused at various later levels. It is one of the differentiating tests on which student groups can be differentiated.

6. Arithmetical reasoning can be said to be not such a well developed mode of daily work. The higher general ability reflected on this test is probably the reason why the test has significant relationships with tests of verbal ability and ability for three dimensional space perception. It seems that at high school level it was one of the outstanding achievements of this group, together with English vocabulary. The meaningfulness of this ability is lost at later and last final examination levels because probably Inter-Biology and medical school examinations are not loaded with arithmetical reasoning questions. It has to be noted that within the three clinical groups there is a steady increase in the mean scores, showing that arithmetical reasoning has to be increased in order to successfully complete medical training. Probably, it can be suggested that total negligence of arithmetical reasoning in medical training is not desirable, nor it should be practical, specially when we know that it is one of the most universally used abilities. It can be said that neither the high order mathematical abstractions nor the lowest level computational work may be recommended for this group, but certainly every day arithmetical reasoning problems should be kept practice of.
7. Test 7 is another aspect of the two dimensional space perception. It is again a form matching in a setting where visual discrimination of finer detail is more important than only elemental matching of forms as done on test 5. This sample differentiates itself by having appreciably higher mean scores than the criteria group. Significant also is the sameness for the three clinical groups. This test seems to be one of those which runs through the three levels of medical training without being affected by disuse or practice. The test cannot appreciably predict scores, but has some correspondence at all levels of examinations, the preliminary High School and Intermediate as well as the two medical school examinations. Most significant looking correlation is with the last final examination. It may be probably true that fine two dimensional visual discrimination in this sample is not a mere matter of development of concrete common sense, but part of the general ability developed by biology oriented groups of students as different from arithmetic oriented Physical Science or Engineering students.

8. High School examination level is a good indicator of success in medical training. Not only that, the examination has higher than neutral correlations with every variable under study. It can be said that it is an examination at which most talent is used in educational achievement. This group has a very significantly high mean score. It is not an essential condition to appear at the pre-medical test but some that very few low high
school scorers are able to get into medical training.

High School is a better indicator of general ability, is shown by the fact that the correlations between tests 3, 4 and 6 are positive and significant. It is a better predictor of success at other examinations is shown by the fact that very high correlations exist between this and other three examinations. Mean is about +.75 o.b., above the mean of the criteria group which means that as a whole on this variable this sample is equal to 23% of the top criteria sample is likely to score. Also it is known that after finishing the medical training an average doctor is likely to start making about 3.50/- or better. It is strongly indicated that further intensive study of this examination be undertaken to find out more about this sample, to lay down more stable diagnostic matrices. Mean of the 'successful' is 67.3 which is at least +1 S.D. of the criteria group. Probably this will further change if an intensive study is taken up to explore those who are first time successful in medical training. High School examination is to be one of the variables for making a medical profile, along with other variables.

9. The Intermediate examination in this group is indicator of special field of training in biology by higher achievers. Once again there is no restriction to sit in the premedical test but very few below average second class at Inter. examination succeed in getting into medical school. It could be said that those biology students in Inter. who are better than average
- More vocabulary and average in arithmetical reasoning have better chances of successful medical training than the below average have. The mean of the sample is almost equal to +1.5 of the criteria group and the mean of the 'successful' in this group is further higher than this. The examination acts as a weeder of the 'very bright' from the average.

Since, it is the point of bifurcation towards biological training, the suitable detail study at this level can be suggested to find specific subject variables and levels which can lead to better selection of medical students.

10. Last final examination in a sense is the indicator of all the examinations held by the medical college through the university. The meaningfulness of correlations is lost because the student clinical groups and their examinations tend to cancel out aptitude variables. It is seen that English vocabulary at this stage is still significant. Two dimensional discrimination is significant to the same degrees. Meaningful profile is composed of English vocabulary, two dimensional Visual discrimination, High School and Intermediate marks. More meaning should be attached to the means of the three clinical groups and the 'Successful'. This examination is not strictly equal to Graduate examination because it is either a little late or earlier than 4 years after High School. However if we take an average of the years at which the examination is taken
up by students, then it works out to be about equal.
Mean scores are as compared with Graduate mean score
of the criteria, higher appreciably. The three clinical
groups do not differ in the percentage of marks even
though the examination content at all levels is different.
it is probably a way of keeping the standards high, but,
theoretically it can be argued that these levels may not
be so meaningful as they are made out to be.

11. The final examination is not the final of the M.B.B.S.
It is a mixture of the several examination discussed above
but it does. It should be noted that clerical, verbal,
arithmetic reasoning from the GATE are significantly
meaningful for this examination. Highest predictability
is achieved by the academic tests but other qualitative
indications are expressed through the three test
variables, which are significantly correlated with this
examination. Final examination is better predicted by
High School then later and followed by last final
examination in the academic examination series, in that
order. It seems peculiar for this group that earlier
examination has higher predictive value than later
examinations. Generally the trend is reverse of what
is noted here. Longer the distance between examinations
lesser the degree of accuracy of prediction. It may
mean that the general ability becomes the important
variable in the process of achievement as it exists in
this highly selected, top ability group of medical
students. Medical training is more weighted on general
ability than any of the special abilities tested here except clerical perception and verbal ability.

12. The category 'Successful' has been created to see the differences existing within the groups of the medical students. Out of 145 only 64 are included in this category. They represent passes on all accounts in the three clinical groups put together. On all the variables the Means are higher. On test 1, 4, H.J., last final and final examination these differences on the Means scores are significantly higher. Compared with the criteria group Means, these scores are significantly higher in most cases. It could be said that at all levels of medical college examinations higher scoring pupils are in general the successful ones and show higher level of performance on diverse aptitude tests than the total group does.

13. The Sex categories have been taken up for comparison because the number in each case is large enough to give relatively stable results. It seems that generally the boys have a slightly higher general ability and clerical perception than the girls. On the other hand probably their motivational level, habits of study and sense of competition is lower than that of the girls as they show lower academic achievement than shown by slightly less generally able girls. Moreover girls show higher Mean marks on test 5 and 7, the two dimensional perception tests. As indicated in this sample, performance on these tests has correspondence with laboratory work.
and general concrete common sense which manifests in reaching to the two dimensional aspects of the physical environment. The boys on the other hand show higher clerical perception indicating more verbal elemental bookish type of perception.

Kest studies on the other hand show that girls score higher than boys on clerical tests and boys score higher on physical perceptual tests. The trend is reversed in the case of this sample. It probably only shows that girls develop the aptitude in hard work of the laboratory at this level of abilities. The homogeneity as shown by the standard deviations is higher in the case of girls for academic examinations and the boys show more compact scores on general ability tests and the clerical aptitude test.

14. Age differences have not been worked out. Mean age for the group is 22 years 6 months. There are 79 students below this mean and 66 above it. Age has not been reported by 1 student. There are overlaps of age between the clinical groups. It is one of the reasons of not classifying the group in age steps. Also there is model distribution on account of age. There are modes are at 21, 23 and 25 years. Very few cases of above 25 years are available in the total group though the range extends between 19 years 7 months and 30 years 9 months.
15. Clinical group categories bring out some of the points of interest about this sample. It is obvious that most achievement scores are yet to come, as is the development of the general ability composed of arithmetical reasoning or verbal reasoning. They are comparatively weak in both these respects.

Clinical group II shows high scores on most achievement and test scores. They are superior group among the three. It seems that the group has elements of students, who as a whole are more able and highly motivated except for the two dimensional perception ability.

Third clinical group is comparatively experienced group but seems to consist of those elements of medical students who have come to this level after going through a process of failing several times. The Beacon of academic achievement marks shows the fact very clearly. They seem to be the stragglers who should have not been in the medical line but cannot get out of it after completing the major part of training. They are not too varied within themselves in most respects as indicated by the low standard deviations. It is a further indication that they are a negatively selected sample which is not too different within its membership.

It shall have to be said in favour of medical college examinations that probably they are less subjective and chance success is fairly reduced by
having this cumulative 50% in individual and 50% in aggregate standard of passing.

Conclusions:

1. Medical group is a professional training group. The training is broken down into three successive stages known as clinical group. There is a process of examination which makes it compulsory for each student to pass through all these stages in the same succession. Laxative jumps are prohibited from the first to third. This process acts as a factor in the progressive cumulative achievement and maintaining of the minimum standards at all levels of study.

2. Medical student samples are usually localized, easy to approach and have rapport with. The average number per test administration session is higher than many other non-professional groups. It can be concluded that their approach to the studies of the present kind is qualitatively more mature, understanding, and characteristic of professional training in which they are engaged in.

3. The pooled group data in the present study was expected to be contaminated by the factors of non-similarities of learning situations at the three levels of clinical groups. The net effect seems to be to suppress the measures which have been used for statistical analysis. The level and meanings of correlations achieved have decreased, but other statistics used has
made it possible to raise the value of these. Irrespective of this sample on a premedical test makes it easier to diagnose with certainty the successful medical student even at the beginning stages. The sheer level of scores of this sample can be used for intergroup diagnosis.

4. Clerical aptitude seems to be a kind of perception of linguistic elements which is part of the behaviour required in academic achievement. Perceptual aspect seems to be common in clerical and two dimensional perception tests as well as academic and computational numerical performance in this group. It is possible that another element pervading through this sample is that of accuracy which seems to be a generalised attitude towards most mental work.

5. Accuracy is desirable in all forms of responses whether they result in clerical mechanical or computational work. Considering the level of ability in this sample, it might easily be understood that part of their achievement is this adoption of this attitude towards most of their training. It could easily be the one outstanding study habit in this sample which differentiates them from lower order ability and aptitude groups.

6. Three dimensional space utilization is not one of the strong points of this sample. It has proved to be of little meaning also. It seems that sheer general ability is the factor which leads this group to score at par with other student groups.
The fact that consistently, all Indian samples score below the mean of the American sample on this test seems to indicate the culture factor differentiating the two.

7. English verbal reasoning is the most meaningful factor for this sample. It runs through all academic achievement scores as a common factor. Within the group it is of low level in the initial stages but gets developed appreciably in the later stabilizing stages. It is not of the same order as American sample but certainly has value for diagnostic purposes, specially at Intermediate examination stage. It can be concluded that high English achievement together with first class Intermediate marks in biology can make a good medical student with reasonable chances of success through out academic career and later professional work.

6. Numerical reasoning is part of universal mental activity. The fact that in this sample meaningful relationships are achieved with some of the academic achievement scores only, goes to show that no particular exercise is done neither any weight assigned for this task and ability. Final training stage is reached and meaning also is assigned. Numerical ability is a primary factor in finding success in most professions more so in medical field. Biometrical or some other medical tasks should be made a part of Int. Med. and later medical courses.
9. The factors of two dimensional matching and discrimination go to make the composite two dimensional perceptual ability. It seems to be the most meaningful secondary aptitude for this sample. It is a distinct feature of this sample that this special ability takes meaning at almost all levels of academic achievement. It is a discriminating factor. It can be concluded that this type of test should be part of the battery used for distinguishing the probable success in medical training.

10. High School examination achievement is an indicator of success at later academic examinations more so in medical group. The structure and age degree of relationship existing between this and two subtests apply shows that it is an examination at which general aptitude plays a meaningful role. Evidence clearly shows that spatiotemporal structure probably is directly related with achievement at this examination. It is the beginning of a career in its truist sense. Only exceptions change the later pattern, probably highly motivated girls. The examination is probably the best indicator of learnability, educability etc. in this group.

11. Intermediate examination is the preparation for getting into medical examination. Biology, factual and laboratory learning, are imparted for the two years. Lass of English and numerical reasoning takes place. The fact that they are both useful and
meaningful at this stage. Predictive value of the examination for later medical training is evident and naturally this examination together with the arithmetical and verbal reasoning may form the basis for a differential diagnostic pattern for this group of students.

12. The two medical college academic examinations are predictively related with the two other earlier examinations. It should be concluded that English, arithmetical and clerical perception tests are related positively and significantly with at least one of these. They are all part of the aptitude profile of the medical group. The standards at the examinations are kept reasonably high and naturally all rounder professional achievement is desired as is seen by the mean scores of the 'successful' students at these examinations.

13. 'Successful' are generally better on the mean than the total group except on test 3. The means may have meaning for deriving the cut off scores for this sample for various tests.

14. There are sex differences in most respects. Boys are more able than girls and achieve less on the whole. They are more clerical and bookish. Girls achieve high, seen to be more motivated and probably slightly less able. They are surprisingly, possessors of higher level of two dimensional perceptual ability. Their English and Arithmetic are weaker than that of boys.
Clinical Group I is the youngest, least variety trained medical group. It shows the signs of transfer from intermediate learning. They are weak in English, arithmetic and strongly in perceptual ability. Academic achievement is equal to other groups but medical college academic achievement is not equal to that of others because they are young.

Clinical group II is the middle group and shows the highest or most developed antecedent picture. They are strongest in clinical, English arithmetical reasoning and High School achievement. Process of selection has brought the brightest of their class to this stage. They are the surrounded high achievement and high aptitude group.

Clinical group III is the oldest and comparably the weaker of the three groups. They have low academic achievement at all stages specially the final. Antidically also their scores are comparably less imposing or remarkable. Comparably they are more compact as a group which leads to conclude that they are the more homogeneously failed group. They will finish with some younger group and probably in smaller numbers.

SUMMARY

Pharmacy course at the diploma and bachelor and masters level is a special feature of Gujarat University. Bachelor of Pharmacy is a post-graduate degree in the sense that it takes
three years after the Inter Science degree or two years after the diploma. In all there are four levels of study in Pharmacy to which a student can take admission if he has a Inter Science degree. In all it is a five year training after High School or three years after Intermediate examination.

The present group of students is the Pharmacy group which appeared for their degree in 1961. There were 72 students who registered in this course and all 72 appeared for this examination. University examination records show that there were 5 in first class, 50 in second class, and 6 in Pass class. In all 61 out of 72 successfully appeared in the examination, 11 failed, the result for the group was 84.7%.

The present group who volunteered for this study numbers 69 out of 72 about 83.3%. There are 4 in first class, 41 in second class, and 5 in Pass class, 10 failures, from within the group which appeared for the test. There are 57 boys and only 3 girls in the group. The above figure show that the present sample is fairly random and representative of the Pharmacy final group.

Initial contact for the study was done in the usual manner by writing and then following it up with a personal call on the principal of the college. The reception of the study and the author was good. The amount of cooperation extended can be rated as
'enthusiastic'. Sometimes the teachers volunteered to forge a lecture period to get the testing done.

Generally these students did not ask many questions about the study. It was given to understand by one of their teachers that the students had to study a paper on 'business management, personnel practices and methods of selection.' Probably this gave them insight into the nature of test and how it could be done in groups. Probably they were given to understand that it was not only cooperation in a study, as much as learning on their part.

Pharmacy is a specialized field which is striving to get a full fledged professional stature which has not been present because the field is only developing now. M.S. college of Pharmacy is one of the earliest established schools in the field, in India, training upto B.Pharmacy & M.Pharmacy, manufacturing, chemistry, physiology, pathology, drug chemistry, pharmacology, pharmaceutics, business management, accountancy etc. are part of the courses of study. It is to be understood that students have to do laboratory work at all levels. It is a restricted field so far but a very rapidly expanding industry. Major areas of work are teaching and research, public and private manufacturing, service in these manufacturing concerns, salesmanship and marketing, owning or service of drug dispensing shops and acting as selling agents. It can be said that the
profession has all the various levels of unskilled, semi-skilled, skilled, clerical, managerial and top executive and professional levels of work as well as salary and income according to the level of work prescribed.

METHOD, MATERIAL & DATA:

The method adopted does not differ from other groups. The group testing procedure with test administration by the author was adopted as for other student samples. It should be noted that the examination in Pharmacy college is again a cumulative examination procedure. A student has to pass all the previous two examinations before he can appear for the final examination. The procedure is that B.Pharm. I is a test for 775 marks, B.Pharm.II cumulates to 1,775 and B.Pharm. Final goes upto 1,880. Classes are assigned on the total of the three examinations. Pass class is obtained at 60%, II at 50%, I at 60% and I with distinction at 85%. In each paper also in order to pass they have to gain the minimum pass marks.

Considering the above information, it was found that the last Final and Final marks will be considered adequate for the purposes of analysis. High School and Intermediate marks will be the measures of academic preliminary training for our purposes. The last final marks are equal to graduate level because the examination is taken after four years of completing High School.
Further, it should be noted that the sample size does not permit to see the stable differences between failures and pass. The large number of successful at the II nd class level seems to be the rule and probably failures are those unmotivated, not ready or sick students who could not prepare themselves not because they are low ability or less qualified but because of other reasons. It is proposed that sex differences can be sorted out indicative from the total student sample. The same can be stipulated for age differences. For differentiating between 'pass' and 'fails', the cut off scores can be placed to reasonably used out the lowest scores. This is also forced upon the study because of the low number in the sample. The difficulty visualized is that for a sample of 60, correlations of .250 and .325 are found to be significant at .05 and .01 levels of confidence. It will be seen that these levels are not achieved by many correlations. On the other hand, if the cut off score on a test is kept to have about 50% 'pass' then smaller correlations are found to be useful for predictive purposes. Sameness of the sample in this case cannot be helped because the total population of this group is not too large to start with. All the descriptive analysis have been presented together with product moment correlations.

Results:

Inspection of table No. 7 (see appendix)
brings out the following outstanding facts about this sample:

1. On test 1 the sample has a Mean of 44 with a S.D. of 1.36 and 3.0. The Mean score is slightly lower than the medical group the Mean of which is 44.3. It is slightly higher than the Mean of the criterion group as well as appreciably higher than the total students group. The S.D. is comparably larger as is the 3.0. It is seen that the homogeneity with regard to this factor is not too different than achieved for the large student sample. It should be pointed out that the test may have significance as far as the profile of aptitudes for this sample is concerned. Inspection of distribution shows a fairly normal distribution with a slight tendency towards negative skewness.

The correlations between the tests and others in the battery show some expected and other unexpected pictures. Expected is .02 with test 2. Correlations with tests 2, 4, 5, 6, 7 are all above .254 which is significant at .05 level. Correlation with test 2 is .607 which is very high. Amongst the academic achievement tests the correlations are neutral and indicative of negative relationships. In this group it may be expected that at every level clerical perception is not meaningfully related but the fact that a correlation of .395 is achieved between the test and final examination certainly needs comment.
2. Mean score of this sample on the computational test is 23.76 with a σ = 6 and 5.82 4.06. This mean is at least one point below that of the criteria group and very slightly below that of the medical group. The variability is larger than that of the medical group. The variability is larger than that of the medical group. It is expected that probably this group on the whole indulges in such computations yet the general level of aptitude is slightly below the medical counterparts. It is not too different than the mean of the total student sample.

The correlations are both negative and positive. High positive correlations exist between this test and tests 1, 4, 5, 6. Very high positive correlations exist between 1, 2, 6 which may have a specific meaning in this sample. Negative but near neutral correlation exists between this test 3, last final. Relatively high negative correlation exist between High School, Inter percentage of marks and test 2 marks. Correlation with Inter is significant at .01 level. It is interesting to see that negative correlations suddenly change direction and, become a quite reasonably high positive correlation at the final examination level.

Though it is not expected but the test emerges as a meaningful variable in the group.

3. The mean of the sample on test 3 is 13.55 with a σ = 6.64 and 5.2 5.01. It is slightly higher
than the medical group and also the criteria group.
Three dimensional visualization seems to be achievement in this sample.

The correlations with tests 5 and 7 are significantly high which will be expected. Neutral correlations with test 1, 2 are expected. Both these tests 1 and 2 have elements of general ability but the correlation of the test does not suggest that the sample has expressed the common element of general ability in the periphery on the two tests. Even the correlation with test 6 does not suggest this fact. Correlations with High School and Inter are low but positive. Neutral correlations exist towards both negative and positive sides for the two Pharmacy college examinations.

Mean of the sample on test 4 is 13.85 with a 5.8%., .74 and 3.5, 5.79. The mean is slightly below that of the medical group and quite a bit below the criteria group Mean. The variability in the group with regard to this variable is lessor than the other groups discussed so far - the criteria and the medical groups.

Neutral correlations exist between this test and test 3, 7 and Inter. Other correlations are very impressive in size. On one side mediocre but significant correlations are achieved with test 2 and 6, tests of arithmetical reasoning and computation. High School, last final and final examinations have very high and
and significant correlations with the test. It is indicated that English vocabulary and verbal reasoning goes along with the achievement at school except for Inter. It should be understood that Inter examination in this group is a mixed category examination. It is possible that Inter, Science, mathematics as well as Biology as well as I and II year of Pharmacy students are all mixed up to form this group with one outstanding fact about them. They were better in English on the average. This is a test which has meaning towards the prediction of marks and success at various examination for this study area is obvious by the degree of correspondence the scores show with other examination scores.

5. Mean of the group on test 5 is 26.85 with S.E.M. 7 and S.D. 5.46. The criteria group mean is two points below and the medical group mean one point above this. The level of achievement on this test probably becomes distinctly different than that of other groups.

Correlation with tests 1, 2 and 6 are very high, positive and indicative of highly meaningful co-existence between these. It seems that 'matching' as it exists in tests 1 and 5 together with numerical computation are the primary special abilities developed highly within the group. The test has fairly high correspondence with tests 3, 4, 6 shows that the ability in general is though spread out but most close
relationships exist with mechanical matching. It almost seems to strongly point out that mechanical, verbal, computational, reasoning of arithmetical and verbal type are strongly co-existent with figure matching as in test 5, for this group. Exclusively by themselves, they are not independently so very important or strong but in co-existence with figure matching they become strong and meaningful.

Important theoretical points can be raised and only intensive study can provide some suggestive answers. The test scores are significantly, mildly negatively correlated with test at high school and intermediate level. It has to be seen in the consideration of the meaningfulness of these examination marks with SATB scores. It is possible that two dimensional perception was not as strong a point as three dimensional spatial visualization was. The Pharmacy achievement test scores have mediocre correlations but positive, showing probably that some learning at college has helped this type of ability to grow and expand and expansion still keeps on at this level. On the whole on the one hand the test has significant relationship with other special abilities tests and also with the general ability tests. It starts with negative relations at early academic training but gets mediocre positive relationship with the professional academic achievement scores.
6. Mean of the scores of the group on test 5 is 11 with S.E.M. .23 and S.D. 2.58. This mean score is below the mean score of the criteria group as well as the medical group. It is generally understood that the students have more use of language than numbers but the general level of the course will stipulate higher scores on this test also.

Correlations with the two earlier academic examinations are negative and are of at least mediocre strength. It only means that these measures have opposing correspondence with each other. The Pharmacy last final examination has positive but mediocre correlation with the test and the final examination has neutral correlation. Correlations between tests 6, 3 and 4 are .127 and .301. Latter correlation is significant at .05 level. The general ability lendings do not seem to operate in this group otherwise the intercorrelations between these tests should be higher and significant. Correlations between test 6, 2 and 1 are .47 and .276; both of these are significant. They are expected because the three tests are closely related in terms of work aptitudes for samples involved in clerical and computational work. Again, surprisingly tests 6, 5, 7 are highly correlated with each other. It must be understood that reasoning aspect may not at all be involved in this case. Theoretically, it does not seem to be clear that in this group most unexpected matrices are achieved. It shall have to
be explained by assuming a very unorthodox structure of abilities, achievements and general performance, together with their strong and weak points.

7. Mean of the group on test 7 is 24.35 with a S.E.M. of .62 and S.D. of 4.63. This mean score is at least 2 raw score points higher than that of the criteria group and is also higher than the medical group mean score.

The correlations with the four academic achievement examinations show the negative neutral and low correlations at High School and Intermediate levels. The correlations becomes impressive at the last final examination level but recedes to neutral level at the final examination level. Correlations with tests 3, 4, 6 are .427, .007 and .311. These correlations will be expected except the one with test 6. It seems to be shown that general ability composed of three dimensional visualization and arithmetical reasoning goes along with two dimensional discrimination tested by this test. Verbal reasoning and two dimensional discrimination are not expected to go together which they do not. Correlation with test 5 is positive and highest obtained for any of the variables and it is expected. Mediocre positive correlations are achieved between this test and tests of clerical perception and numerical computations.

8. The mean of High School percentage of marks obtained is 52.85 with a S.E.M. 1.02 and S.D.
of 3.2. The distribution shows that 7 are in III class, 42 in second class and 14 in the first class or better. The difference in the mean of the criteria group and this group is appreciable. It is at least 4 raw scores below, which is about .5 S.D. below. Compared with the Medical group the mean of this group is decidedly different and low. It is about at least 10 raw points, i.e., equal to about 1.5 S.D. below the mean of the Medical group. It could be said that about ten per cent may overlap with the lowest of the Medical group, in this respect. Otherwise the distribution seems slightly negatively skewed.

Correlations between A.W. and tests
1, 3, 6 are not uniform. Tests 3 and 4 show mediocre correlations but positive; with that of test 6 there is low negative correlation. Negative correlations with test 6 and 2 lend to indicate that numerical work was neglected. Further positive though low correlations with tests 3 and 4 also indicate the same. The dimensional perception tests do not correlate and are slightly negatively correlated. It is possible that mechanical matching as special ability was not very well developed in this group.

Correlations with later achievement
scores at lower, last final and final examinations show mediocre positive relationship. It is as
high as any other test and lower than what is achieved by the vocabulary test. It seems to be very heterogeneous group as far as their background and aptitudinal development is concerned.

9. Intermediate examination Mean of percentage of marks is 52 with a S.D. of .9 and S.D. of 7.0. It is 3 raw score as points above the mean of the criteria group and about 10 points below that of the medical group. There are 9 in III, 44 in II and 5 in the 1st class or better. There is a slight positive skew and otherwise it look a fairly normal distribution. The correlations with the general ability tests points out slight positive correlations with test 3 and 4. There is significant negative correlation of −.232 with test 5. It seems, the tests of general ability loose their value at this stage. There are appreciably high negative correlations with the clerical and numerical computation tests. These special abilities at this level also show the same trend that in this group they are negatively utilised for achievement at Inter examination level. Further it has the same negative correlations with the other two perceptual tests. The academic Inter tests also have a neutral negative at the Last Final and neutral positive correlation at the final examination level. It seems that Intermediate examination marks in this group are entirely meaningless scores. But, it should be kept in mind
that whether there is meaning or not some kind of consideration is given to intermediate marks, otherwise a majority of second and first class will not congregate to know how this happens.

10. Last final examination marks have a mean of 54.34 with a S.E. of .03 and a S.D. of 4.99.
This score shows several important points. The achievement seems to increase on this point. Further, the homogeneity in the group scores increases appreciably.
It is to be understood that conditions for pass are strict and regimented practice at Pharmacy College regarding the course and laboratory work is strict and rigid. Inspection shows a decidedly negatively skewed distribution. There are 3 in pass class, 50 in Second and 5 in the first class.

Correlations with tests 3, 4, 6 shows that at this stage space visualization become neutral.
Test 4 and 6 are highly and slightly positively correlated respectively. Once again english vocabulary is most important aspect of general ability in this group at this examination. Tests of clerical and computational abilities are negatively correlated.
Tests of two dimensional perception correlate positively at mediocre levels. These tests have higher correspondence with those examination marks, probably equal to that had by earlier academic scores in this group. It has fair positive correlation with the final examination.
11. Mean of Final Examination of this group is 55.39 with $\mu_a = 45$ and $\sigma = 3.51$. There are evidences to show that the distribution is slightly positively skewed. There is further increase in the percentage of marks of the group and a decrease in 3.9 showing further homogeneity.

Correlations with tests 3-4,5 show that English verbal ability has the highest and significant correspondence with marks at this level. The other two aspects show neutral relationship. Clerical perception becomes meaningful with a $r$ of .395 which is significant at .01 level. Mediocre positive relationship exists with numerical ability tests 2 and 6. Test 5 of the two dimensional test has fair correlation. Amongst the achievement examinations High School and Last final examinations have fair correlations. Last final examination has a correlation of .291 with this examination which is significant at .05 level of confidence.

12. Age and sex difference category scores have not been worked because of the small of the sample.

Discussion:

1. The sample in this group needs to be discussed in order to clarify some of the results derived. The college gives admissions to High School pass students to their I Pharmacy course. Looking towards the high School marks it deserves.
consideration to see that there are very few lower than 11th class students. On the other hand it is to be significantly considered that no less than 23 out of 60 respondents in this sample have attended schools at different places even though the examination authority may have been the same. This fact must be born in mind while discussing the lack of correspondence between scores at High School level. This partially accounts for the insignificant correlations obtained peculiarly in this group.

The college allows Intermediate science, B.Sc. and diploma in Pharmacy, students to enroll themselves for B.Pharmacy course. The results are that there are no less than 10 students who come after inter science diploma from kharagpur, calcutta and a majority from sanjay University. at this level there are 10 students who have diploma in Pharmacy which is equal to Inter Science. There are 9 students who have joined the course after finishing their B.Sc. training. It will be seen that intermediate academic course at intermediate level are not purely intermediate examination scores of the usual type. Examination content, centre, examining body as well as the content of examination, differ in cases of more than 60% of these students. It should be pointed out that in some cases the level of percentage of marks even though nominally is the same, differs as far as its achievement level is concerned. In the
light of the above, in this group it shall be considered usual that there is hardly any noticeable correlations with some of the special ability tests. The information cited above comes from the consultation of the 'Personal data sheet' which had to be filled out by each respondent at the time of finishing the test.

2. Clerical aptitude test scores have high inter correlations with scores on other subtests. It may be pointed out that form matching corresponds with this conglomeration of abilities in this group probably more because these students invariably regardless of place or course had some type of clerical perceptual, computational and laboratory work to do as a compulsory task. It may be suggested that 'matching ability' in this group has been a common factor. The fact cannot be denied that low correlations exist between examination marks and this test, but the marks of various examinations are contaminated by other factors in this group. We find a significant correlation with clerical perception and final examination marks and this probably shows the final form of the structure of this group on the basis of clerical perceptual ability.

3. It suggests that this group may have very nominal level of computational ability. Generally there is practice for this type of work but biology students do more laboratory and finger
dexterity work resulting in two dimensional matching than strengthening numerical ability. It seems most accentuated in this group. The fact that computational work is a desirable asset which goes along with Pharmacy final marks is demonstrated. Computational ability may have been a liability for Intermediate examination but proves otherwise here. This will be one of the trouble area in this group when beginning students have to develop a comparatively diverse skill in order to do better in Pharmacy.

4. Three dimensional space visualization shows that on the whole it is a form of concrete intelligence which is part of common sense which helps in dealing with physical environment and as science students this group developed it mildly. In fact that it has been left latent at the college or is of no value in the Pharmacy examination is not a liability but no asset either in the present circumstances.

5. English vocabulary and verbal reasoning is the common non factor in this comparatively heterogeneous sample. It shows more meaning than the mechanical comprehension or item matching has in science students. Specially interesting feature is that it shows correspondence with clerical perception, computational ability and arithmetical reasoning, item matching, High School percentage of marks, last final examination and final examination
marks. It shows itself to be nucleus of the common factor existing in this group. It seems that verbal element matching, verbal reasoning, arithmetical reasoning written through English numerals are all extensions of high achievement of English vocabulary.

Tested aptitude structure may be imagined as a conglomeration of four aptitudes, culmination points of which are the examination marks at level various levels. Largest area covered is by English verbal ability which has an element of commonality with the clerical perception and numerical ability which in itself is connected with perceptual ability which has a common element with examinations. Psychometrically, it may be of interest to study these as they go to form part of performance in the examination in this group.

6. The mean score for the group on form matching test is comparably higher and the importance of the test cannot be denied. It forms part of the tests which may distinguish this group with others. It should be discussed that the test forms essential bonds with other special ability tests as far as the present performance of this group is concerned. It has more meaning towards the examination than the test 7 which has more meaning with the last final examination marks. It is possible that there is an element of general ability of this group which this test measures even though there are
strictly no leadings of general ability. It can be suggested that average ability students are very alike each other in performance of this time.

7. Arithmetical reasoning in this group shows lower achievement. The meaningful relations exists with most tests, most highly with the computational test which is expected. It suggests a co-existence of some element of numerical reasoning with form matching with form matching and discrimination. It seems to suggest that probably what has been lost in the numerical ability development has been compensated in the two dimensional perceptual ability. High mean score on the other two tests show this together with the high correlations obtained between tests 2, 6, 5, 7. Academic achievement has little to do with arithmetical reasoning. On the other hand it can be shown that they are not altogether devoid of ability.

8. The test 7 mean score is relatively high. It has meaningful relation with last final examination. Together with test 5 it can form a decisive aptitude pattern of this group. There is closely connected pattern of aptitudes displayed by this group which suggests that the group is a second order science, strong in English, with clerical and perceptual aptitudes as close special abilities which are weakly connected with computation aspects of numerical aptitude.
9. High School marks in this group represent various examination boards and examination standards. There is mild positive relationship with the tests 3 and 4 which have a loading of general ability. Surprisingly it has comparatively lesser predictive value for the three succeeding achievement tests, least for last final examination and equal sized for Intermediate and final examination. As opposed to most cases of student groups this examination exhibits most indifferent relationship with all the special ability tests as well as with other examinations for this group. Probably there are few common elements for this examination at various places in India except English vocabulary with which there is significant correlation. It can be said that it is not a good measure for inclusion in the meaningful profile of the group except to show average achievement.

10. Intermediate examination follows the same trend as High School but a little more decisively. It is interesting at this level in this group to see that numerical ability is negatively related with achievement of this group at Intermediate level. It can be a good guess to say that this sample totally ignored the numerical work in favour of verbal linguistic achievement at which they are better to start with. Also the correlations with verbal reasoning are only indicative. The mixture of students from different places in this group, it seems is responsible for making this examination
a meaningless variable. On the other hand it should be understood that achievement level at this or equivalent examination is chief criteria of selection in Pharmacy course, even though it may not have any meaning. The fact shows that achievement at this time is understood to be an indicator of later achievement. It shows itself to have least positive correspondence with other test and examination marks.

11. The last final examination is a test of academic achievement in which it is expected that Pharmacy course work, will have a direct effect in developing the relationships with aptitude test scores. Two dimensional perception tests have higher correlations to show that the training in the first two years stabilizes this aptitude to a certain level. Arithmetical reasoning assumes a little meaning and verbal reasoning becomes very significant. High School marks have more but insignificant correspondence while as Intermediate marks have none. It has a slight correlation with Final examination. It suggests inclusion of tests 4, 6 to the aptitude profile.

12. The final examination shows itself to be an independent measure slightly related with the last final. The correlations can be interpreted to mean that those which could have meaning at earlier stages are certainly to be retained as important tests e.g., Test 4, test 7 and test 6. Somehow
it is found that test 3 has had no correspondence with
the achievement tests in Pharmacy and score on it has
meaning only in helping measure important aptitude
from general ability measurement point of view. The
mean on test 3 is higher than quite a few student
groups which may easily provide an additional measure.
It shows that Pharmacy group may turn out to be a
second class achievement group with perceptual ability
as of a higher order to distinguish them from others.

CONCLUSIONS:

1. Pharmacy students come from a very varied
   background and the level in the second class category
   is very difficult to pin point specially on the
   basis of percentage of marks gained at this level.

2. Probably a majority of High School second
   class science group which could not succeed in
   medical because of the level of achievement and
   ability but had strong English and weak mathematics
   have taken up this training.

3. The variety of background at the
   Intermediate and equivalent examination makes this
   a very heterogeneous group. Again English vocabulary,
   spatial visualization are the chief aptitudes
   on which achievement has correspondence with. It
   proves to be a meaningless examination by itself for
   this group, but gets chief meaning from the college
   admission rules.
4. Though clerical and computational work is not found to have a high level of scores in the group, but in the long run it measures up to having a relevance in the later stages of the training specially at the very end.

5. The dimensional perception in one or other manner is an outstanding common element which goes through the group performance throughout and shows the group to have a special ability which may be characteristic of this group even at a higher level than the higher group in this area - the medical group.

6. There is conglomeration of correlations achieved for this group to show that the levels at which aptitude scores become meaningless are varied. On the other hand, there is no test in the battery except test 3 which hasn't yet meaningful correspondence at one or other level. In fact, several times in the discussion phase, it has been brought out that heterogeneity of this group is apparent as far as test and examination scores are concerned. On the other hand meaningful scores are derived for each of the special aptitudes tested by the GMAT.

7. The level of scores on most tests and examination makes it a distinctly different sample than others but there may be a profile to be later
derived by comparing the group scores with other group scores. Most distinct trend is for this group to have a slightly better than average general ability in close correspondence with perceptual two dimensional followed by a slightly better clerical and computational or numerical ability.

8. In the whole it can be said that Pharmacy group is to have better than average score on Science courses at High School and Intermediate or equivalent examinations with convincingly higher achievement in English.

9. The above academic requirements are to be supplemented by having better than average two dimensional perceptual ability together with clerical and computational aptitude. Measures of general ability show that primarily general ability and its verbal ability aspect, average arithmetical and spatial visualization abilities will form a profile for this course.

10. It is a stratified sample in the sense that there is a process of selection adopted for it. On the other hand the training is of high standard partially because the professionals in the field have two levels of training and this is the higher level. The achievement level in the Pharmacy college keeps increasing successively. If the examination level is the same which is likely, then, it can be
concluded that achievement tests are fairly selective and consistent which result in progressive selection.

11. People with the largest variations in their aims to study in the course exist. It is probably one of the indications why the group shows heterogeneity which keeps on decreasing as stay in the college keeps lengthening.

12. In the whole it can be said that this group seems to be a correct second to the medical group. If they are to act as managers, technicians and salesmen and dispensers i.e. skilled workers in the field, it seems they are good selections on the whole.